

JANUARY, 1910

SELLING ELECTRICITY

The Magazine of Electrical Progress

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JAN 20 1910

A Sign Like This in Every City



We KNOW that you can sell a sign like this to ONE druggist in your city. Because there is ONE druggist who wants to build up his soda fountain trade. This sign will turn the trick. It is a living, MOVING, attention-compelling ADVERTISEMENT.

Show this reproduction to the RIGHT man. Tell him if he wants the sign he must sign the order NOW. You'll get it. Don't think because there's snow on the ground that he won't buy. Get the order NOW and the sign will be up and working on the FIRST day his fountain is open.

SPECIFICATIONS:—Double sided sign, 8' high x 5' wide, wired complete and equipped with a flasher and motor, \$150.00 net F. O. B. Atlantic City. Price does not include any lamps, 350 of which are required, 260 of which are burning at one time. Sign is so flashed that the outline of the glass and holder burn steadily, and the soda bubbles up constantly from the bottom of the glass with a foaming, bubbling effect at the top.

We have DOZENS of equally good moving ADVERTISEMENTS,—for every line of business. Write for details and watch our future ads in this magazine.

Valentine Electric Sign Company

ATLANTIC CITY, N. J.



"AMERICAN" DISC HEATERS



Useful in a hundred and one ways in the home.

Will heat or cook small quantities of food which can be put in a flat bottomed vessel placed on the disc heater; for example, water, breakfast food or frying eggs, chops, etc.

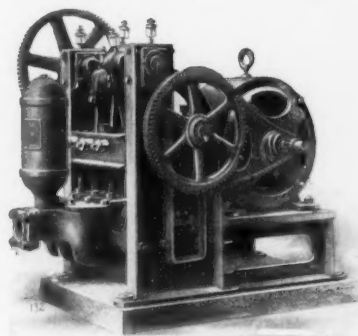
Neat and compact, finished in polished nickel. Heating element instantly replaceable when necessary.

Domestic sizes, 4, 5 or 6 inches in diameter.

American Electrical Heater Co.

Detroit, U. S. A.

Oldest and Largest Exclusive Makers in the World



THE ALDRICH ELECTRIC PUMPS

are applicable for

**Boiler Feeding
Hydraulic Elevators
Water Works
House Pumps**

and

For all Pumping Purposes

SEND FOR PUMP DATA

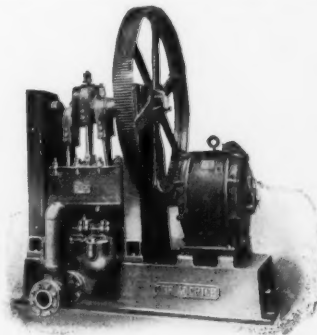
THE ALDRICH PUMP DEPARTMENT

ALLENTOWN, PA.

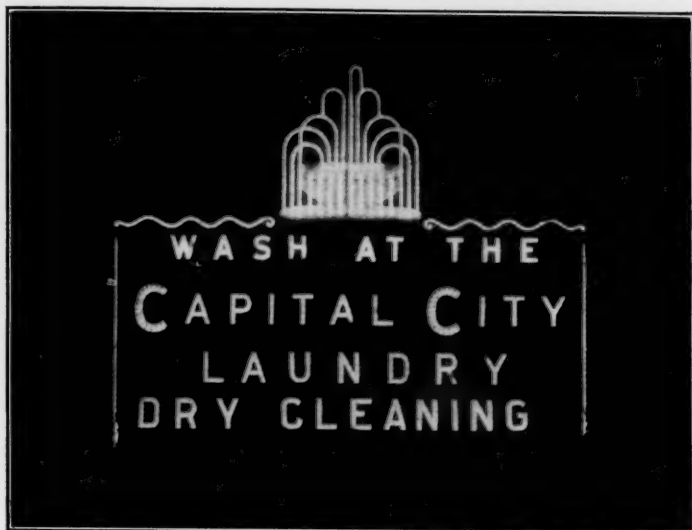
Designing and Selling for

THE ALLENTOWN ROLLING MILLS

BIRDSBORO STEEL FOUNDRY & MACHINE CO.



In writing to advertisers, mention "Selling Electricity."



A "Greenwood" Sign (5' high x 36' wide) in the most prominent location in Atlanta, Ga.

The fountain flows constantly, and the line "WASH AT THE" flashes one word at a time. "DRY CLEANING" also flashes, and the large C's change color three times per cycle of the flasher.

To the Central Station

Individuality is the Sign of to-day and the future. You recognize the fact that the snappy Sign in front of Mr. Jones' place makes Mr. Brown feel that he is **out-classed**. You also know the American spirit; Mr. Brown will want to go him one better, but, if he is tied by contract with a stereotype or poor Sign, it means a dissatisfied customer. **Special Signs** do not always mean more of a money outlay, but some **originality** in design. The Greenwoods have been artists for three generations.

The Greenwood Advertising Company's Signs are Classy

For the benefit of the Central Station that does not know us, we request that you ask us for designs. Either spectacular or the overhead commercial Electric Signs.

We have a most modern equipment in our factory for shaping and developing all metal Signs and use the new **Ripolin enamel finish**.

Let us show you something different.

Greenwood Advertising Company
KNOXVILLE, TENN.

It Appeals to Her.



Delco Electric Flatiron

She Spies It.
She Tries It.
She Buys It.

Why?

Because she learns she can iron 30 minutes after the current is turned off.

Because she finds the top and handle so cool.

Because the iron *will not burn out* running dry.

Write for booklet.

Diamond Electric Company
Binghamton, N. Y.

The "IMPERIAL"

A Portable Vacuum Cleaning Machine combining efficiency, practicability and economy.
Can be attached to any electric light socket.



"The only High-Grade, Efficient Machine on the Market." Guaranteed. A Dividend Payer for Central Stations. Growing concerns and responsible parties wanted as agents. Exclusive territory given. Send for Catalogue and particulars.

Price, \$100. Complete.

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112 West 30th Street, New York.

District Office: 702 Postal Telegraph Building
Chicago, Ill.



Design No. 33513

One of the 500 Designs of Ornamental Poles

For Street and Park Lighting

We have something that
will just suit your conditions.

Our customers get the benefits of our 15
years experience in lamp post manufacture

Elmer P. Morris Co.

1213 West St. Bldg.

NEW YORK

In writing to advertisers, mention "Selling Electricity."

Wouldn't Your Customers Like Their Windows Lighted Like This?



Holophane Glass Reflectors and Holophane-D'Olier Steel Reflectors give the maximum USEFUL illumination at the minimum cost for current. You can satisfy every complaining customer with a Holophane installation PROPERLY designed. The Holophane Company employs a large corps of illuminating engineers who will be glad to give you the benefit of their experience. No charge.

HOLOPHANE COMPANY

Sales Department:

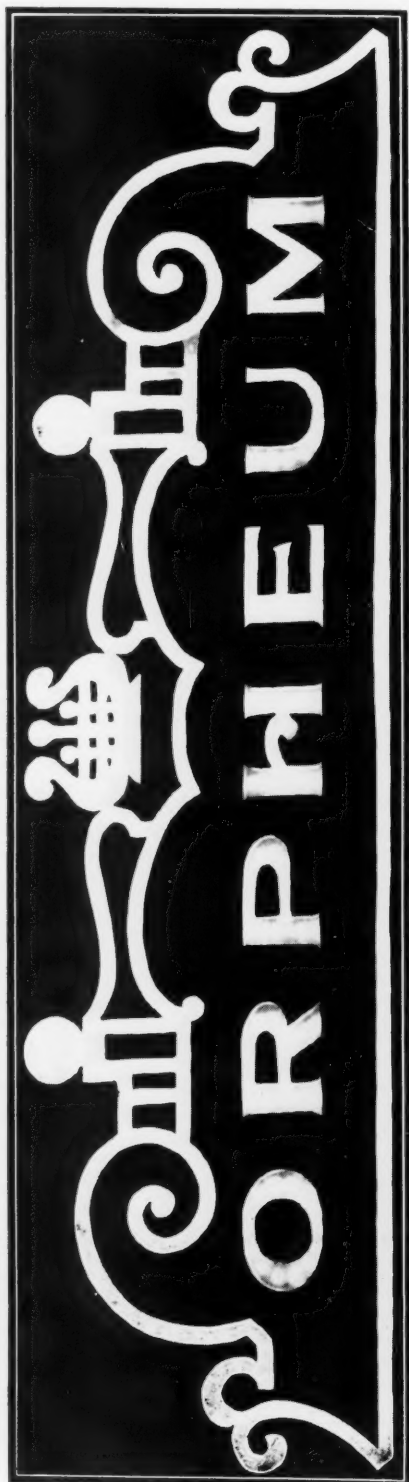
NEWARK, OHIO

New York

Boston

Chicago

San Francisco



Night Photograph of Lighted Border Roof Sign installed on Orpheum Theatre, Cleveland.
Sign: 64 feet long, 14 feet high. Letters, 36-inch grooved type. Contains 365 lamps.

Your Local Theatre Manager Would Appreciate This Sign
—Better Show Him This Picture

Grooved Letters & Grooved Border & Grooved Emblem
That's A & W Construction

OUR SIGNS BURN BRIGHTEST AND LAST LONGEST

WRITE FOR DESIGNS AND BULLETINS

The A & W Electric Sign Company
CLEVELAND, OHIO

SELLING ELECTRICITY

Published monthly by THE RAE COMPANY
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JANUARY, 1910

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T isn't enough
to have brains:
you've got to
act as though you
have 'em, if you
want to get away
with it.



SELLING ELECTRICITY

Vol. VI

JANUARY, 1910

No. 6

Rate Confusion

IN the December issue of this paper was published the following letter.

EDITOR "SELLING ELECTRICITY."

Dear Sir:—

A very intelligent, though very small, consumer recently asked us this question:

"I have an equipment of five sixteen-candle-power lamps and my yearly consumption is 120 kwh., which at your rate of 10 cents per kwh. means a yearly bill of \$12.00.

"Now, I suppose, it costs you about all of that amount to furnish me the service I get, but, if I used, without changing my equipment, 240 kwh. the additional 120 kwh. would cost you about \$1.20, while my bill would be \$24.00. Why?"

"I enclose you herewith \$10.00 for the best answer you can secure, you to be the judge.

Very truly yours,

It is only fair to state that the manager who made the above offer did not ask the question in ignorance. He is among the shrewdest in the industry, a man known far and wide for his papers before the N. E. L. A. and a deep student especially of all that pertains to the technical branch of the business. His object, it is plain, was to secure a good popular and commercial explanation of the single rate method of charging. Of the sixty-odd replies received, only two covered the point at issue—what answer can we give to the customer? The others were, almost without exception, technical expositions of the readiness-to-serve or two-rate system of charging. In no case was the single rate either defended or explained.

The incident is interesting from two standpoints. It proved not only that the single rate cannot, by any show of words or trick of sophistry, be made to appear fair, but it also proved that the commercial men of the industry are as prone to become involved in technicalities as their brothers, the engineers. The problem was to explain satisfactorily an obviously indefensible rate system. The answers we received were a mass of technical rate talk. Of these, the following is an excellent example:

The customer assumes that while his present payment of \$12.00 per annum for 120 kwh. with a maximum demand of about $\frac{1}{4}$ of a kw. does not show much profit, that nevertheless he "pays his way." In this he is in error.

The costs he individually should be charged with are probably about as follows:

Customer cost per annum.....	\$12.00
Capacity cost per annum, $\frac{1}{4}$ kw. at \$60 per kw.	15.00
Total "Readiness to Serve" costs.....	\$27.00
Current cost, 120 kwhs. at (over) 2c per kwh. including lamp renewals.....	\$ 2.40
Total present cost.....	\$29.40
Deduct present revenue.....	12.00
Net present deficit.....	\$17.40

Quite contrary to paying less than 10 cents per kwh. for current in excess of the first 120 kwhs. of the year, he should pay a rate equal to 24.5 cents per kwh. if he would merely "pay his way" under present conditions.

As to the effect of his taking additional current without increasing his present maximum demand we might have:

Total Readiness to Serve costs (as above),...	\$27.00
Current costs (as above) at 2c per kwh.	
120 kwhs. (present consumption),.....	2.40
217½ kwhs. (additional consumption),...	4.35
Revenue from sale of current at 10c per kwh.,	
120 kwhs. at 10c (present),.....	\$12.00
217½ kwhs. at 10c (additional),.....	21.75
337½	\$33.75 \$33.75

Obviously under these conditions, with a maximum demand of not over $\frac{1}{4}$ kw., it will not be until his consumption at 10c per kwh. exceeds 337½ kwhs. that the customer in question will meet his costs. Thereafter and only thereafter he might expect a discount.

It is to explain and automatically adjust such situations that load factor methods of charging are used.

But while this goes a great way, it leaves the customer in the condition of having been silenced rather than convinced. It would seem better if we showed that it is particularly unfair from the Company's standpoint, and that we have such a rate perforce and against our desires and that while it works a hardship on certain customers, it is infinitely harder and more onerous to the Company.

I should answer such a customer thus:

"Your figures are somewhat twisted, but in effect your question is straight. The first 120 kwh. probably cost us nearer \$20 than \$12, so that even when you use 240 kwh. and pay us \$24, we are not making much real money out of your busi-

ness. We can prove this by our books if you care to take the necessary day or two to go into the matter.

"But, when we prove this to you, we prove that we are losing money when we sell you 120 kwh. at \$12 and you immediately ask 'Why?' again.

"The answer is that our rates—and practically all gas and electric rates—are fixed by the terms of our franchise. The City Fathers say, 'You must not charge one man more than another for equal service.' So we must sell you 120 kwh. for \$12, although it costs us \$20 to render this service and supply this much current; and similarly we must charge your neighbor \$48 for 480 kwh., though it may cost us but, say, \$28.80. In one case you pay \$8 less than you should; in the other case, your neighbor pays \$19.20 more than he should.

"The law of averages keeps our production and other costs and our income at a point where we make a fair percentage of profit, but we would rather make that percentage of profit uniformly from all customers than by the present method of selling below cost to some while we are forced by law to overcharge others. However, we can probably never change our rates because it would affect the small customer adversely. It is the small customer who appeals to his alderman and who writes letters to the papers. To make a rate that would be fair to all is impossible until the small man voluntarily offers to pay his own way, and demagogues and yellow journals are all out of business."

Now such an answer, while it lacks the cold figures, is successful in serving two ends: it satisfies the customer that he is getting a bit the best of the present system—which you can prove by your figures, if necessary or desirable—and it instills in his mind the idea that the Company's path is not entirely strewn with primroses and profits. And that last idea is one which should ever be impressed upon the public, not only to counterweigh against the popular notion of immense public service profits, but because it is true.

* * * * *

The results of this rate question are disappointing for more reasons than one. They show primarily, that central station commercial men are seriously lacking in understanding of how to answer a rate question in simple language; that they do not respond quickly to an opportunity to "play politics"; that, finally, the very quality they should cherish—the commercial instinct—is allowed to become befogged with technicalities on very slight provocation.

The man who offered the \$10 prize is primarily a technical man. We suspect him of having neatly "put one over" on the commercial men by asking them a simple question just to see them flounder. Whether it was deliberate or not, he proved what the manager of a large syndicate recently claimed:

"The present trouble with commercial men in the central station is that they're too prone to get tangled up in technicalities. Instead of leading

the technical men out of the morass they let the technical men lead them in. That's why so many of them stop short as solicitors, and that's why we're always looking for new and bigger men to carry on our commercial work—men who can handle successfully the large questions of franchise, finance, rates and policy."

The Mazda Lamp

THE announcement of the placing on the market of the Mazda lamp has probably inspired more comment and inquiry than any other such announcement made to the electrical trade in many years. Though this announcement by the lamp manufacturers was made as lucid as possible, the naturally restricted space of the advertising pages of trade journals has not allowed for a full explanation, and there still seems to be some doubt in the minds of the lamp-buying public as to just what Mazda represents.

The position of those companies who are enjoying the benefits of a co-operative arrangement whereby they can secure the advantage of the latest discoveries and inventions in the art of lamp manufacture, has not been fully appreciated.

The fact that they were marketing a lamp which combined not only all that was best in discovery and invention, but also a selection from all known materials and processes best fitted for each particular type and style of lamp, has led to the adoption of the trade-mark Mazda. This insures the trade against the "me too" methods of doing business, by those manufacturers whose product, through improper and unskilled selection of processes and materials, would have hurt, to some extent, the reputation of the metal filament lamp, and consequently, the lighting industry.

While the Mazda lamp has now a tungsten filament and cannot be called, in the strictest sense of the word, a distinctly new type, it is represented by the manufacturers as the highest type of development in metal filaments. It is not the purpose to restrict Mazda lamp filament entirely to the pure tungsten metal, but that it should be continually improved and developed, so that, although at the present time the Mazda lamp has a tungsten filament, the time may be when some material better suited for high efficiency lamps may be discovered, and may then replace either wholly, or in part, the tungsten metal in Mazda lamp filaments.

In other words, to the casual buyer, the Mazda lamp is in some essentials, "just a tungsten lamp." The real fact is, that though the sizes of the bulbs and wattage ratings remain the same as in the old style tungsten, the Mazda lamp, with its improved filament and various other essential improvements, is as different therefrom as a real diamond from its imitators.

An All Day Power Peak

Selling Power to the Granite Industry in Vermont Under Unique Conditions

By JAMES E. DAVIDSON, PRESIDENT AND GENERAL MANAGER
CONSOLIDATED LIGHTING COMPANY, MONTPELIER, VT.

EVERY central station manager's idea of Utopia is a uniform load curve, indicating a load factor closely approaching 100% for 24-hour periods, month

in the early evening, gradually diminishing up to 11 p. m., when the street lighting is practically the only demand on the plant until 7 o'clock next morning. About that time, an intermittent



Quarrying the Barre granite. A scene in the Wetmore & Morse Quarry. This quarry is thoroughly equipped with electricity. The hoists shown are each operated by 59-hp. in motors. Note the two drills in operation; holes are drilled close together in a straight line as shown in the foreground

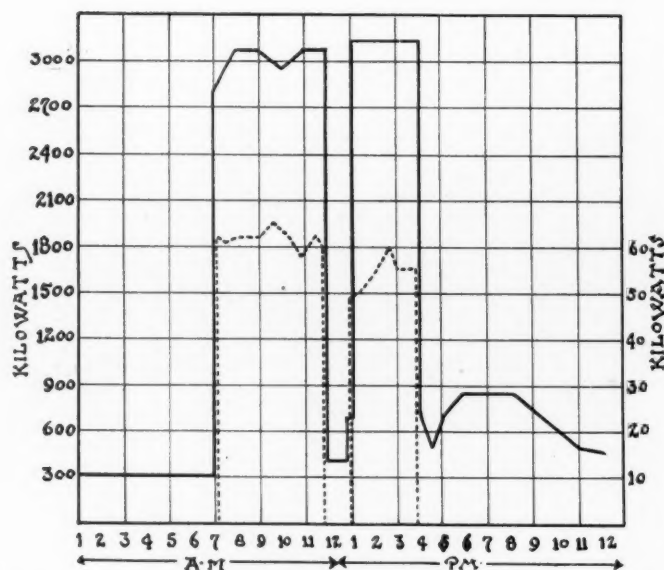
in and month out; but we are all familiar with the very different type of load common in most small cities. There is a high peak for a few hours

power load of a few hundred kilowatt comes on for 9 or 10 hours, such as grist mills, elevators, and small motors for grinding coffee, making ice

cream, etc., all with a low load factor and fluctuating demand. Two or three times a week, a manufacturer or two calls for from 20 to 80 hp. about 4.30 p. m., on a dark day, just when a 20 hp. printing press is running off the evening paper and every extra kw. takes gigantic proportions.

This is the type of load I was accustomed to until I came to Montpelier, Vt., four years ago, and found

The Consolidated Lighting Company serves a community of about 29,000 people in the cities of Montpelier, Barre, Graniteville and Waterbury and several surrounding towns, the heart of the granite industry and the source of the famous Barre granite. The quarrying of the stone and cutting it into building materials and carving it into monuments and mausoleums demands a large amount of power, and since high grade bituminous



Comparative curves showing output of the central station and the load curve of a granite shed of 75-hp. demand. An evidence of the dominating influence of the granite industry

a rather remarkable power situation, in effect, an all day peak 90% of the connected load showing a customer's load factor of 69.7% based on an eight-hour working day. This means a non-lapping load of extreme regularity, with a connected induction motor load during the day of 4650 hp. and a station power factor that runs from 85 to 88%; this in spite of the fact that no synchronous motors are used on our lines.

coal costs \$5.25 in the cities, and \$6.00 delivered at the quarries, the popularity of electricity as a source of power can well be appreciated. This is especially so, as we generate by water about nine months in the year under ordinary circumstances and the power rates are very low. In fact, the coal cost alone at the quarries would about equal our rate per kwh.

Consequently our two companies,

the Consolidated Lighting Company and the Vermont Power & Lighting Company, conducted as separate organizations but under one management, are operating under unique conditions as can readily be seen from the load curve reproduced on the opposite page.

The Barre quarries are located in Graniteville about $2\frac{1}{2}$ miles from Barre city. Here the granite is taken out in the rough and sent to the various towns in this vicinity,

general use for rock excavation; then come the hoists with capacities from a few hundred pounds to 50 tons; grout cars for dumping refuse grout and dirt over the dump pile; and pumps for draining the quarries.

The air compressors range in size from 200 to 2000 cu. ft. per minute capacity and as .176 hp. is required for every cubic foot of air compressed, this represents a considerable demand. The hoists operate



Interior view of the Barclay Brothers Granite Shed, Barre, Vt., showing the polishing wheel to the right and two overhead cranes

where it is carved and finished in the granite "sheds," which are the manufacturing plants. The labor for the carving is mostly Scotch and Italian, and some remarkably fine work is done.

When the property was taken over in May, 1905, our load in the quarries consisted of one 30 hp. motor operating an air compressor, but today we are delivering about 1,000 hp. The greater part of this load consists of air compressors which operate drills, similar to those in

under from 20 to 60 hp. with a load factor of only from 5 to 7%, this being the ratio of connected load to kilowatts consumed in the periods of eight hours. All these hoists are of the alternating current type and work to perfection, being very sensitive in their operation whether handling large or small blocks of granite. They have enormous capacities for overload and are economical as all hoists are equipped with heavy fly wheels to take care of the sudden demand.

The granite sheds, representing the bulk of our power load, operate an interesting variety of equipment, which I can probably cover best by

IMPORTANT RULES

To be Observed in the Care of Electric Motors.

Motors must be kept **CLEAN**. This is the **MOST** important rule to be observed in the care of motors, especially those subjected to granite dust. We urge that compressed air be accessible near each motor so that the dust can be blown off thoroughly, but before applying air to motors, blow out all water that might have accumulated in pipes. Blow out particularly the brushes and starting grid which are located inside the revolving part. Motors should be located in rooms apart from rest of the plant for the purpose of keeping out dust. These rooms should be properly ventilated. Under no circumstances should a motor be allowed to become wet or damp.

STARTING MOTORS.

Before main starting switch is thrown in on internal resistance motors (those having rod at end of bearing) see that starting rod is **PULLED** out as far as it will go.

Take at least **FIFTEEN** (15) seconds to push the rod in, but in no case let more than **THIRTY** (30) seconds be required for the motor to come up to speed. **THE STARTING ROD MUST NOT BE LEFT OPEN, OR PARTIALLY OPEN, WHILE THE MOTOR IS RUNNING, NOR BE OPENED WHILE THE MAIN SWITCH IS CLOSED.** We find that in many cases considerably less than 15 seconds is taken in starting internal resistance motors. This is **VERY DETRIMENTAL** to the motor and **EXPENSIVE** for the owner. The starting devices on motors corresponding exactly to the throttle of an engine, except with the motor they **MUST NOT** be used **TO CUT DOWN SPEED.**

Motors should be started on as **LIGHT LOADS** as possible. Note this particularly in crane service.

INSPECTION.

An examination should be made at least once in three months to see that the air gap all around the armature (the revolving part) is equal on all sides, and that the armature is perfectly free. Bearings **MUST** be replaced before they have worn loose, and when rehabilitated they should be accurately centered. **THIS IS A VERY IMPORTANT POINT.** If the space is not exactly equal it is due to worn bearings.

Examination should be made after each starting of the motor to see that the oil rings in the bearings turn freely. Be sure to keep bearing covers **CLOSED TIGHTLY.**

FUSING.

Motors should be fused with **ENCLOSED FUSES** and the size must not be over 50 per cent. higher than the "amperes" marked on the name plate; as an example, a motor marked 150-Amperes should be protected with fuses of 225-Ampere capacity. **NEVER**, under any circumstances, should **COPPER WIRE** be used in fuse blocks; it not only is dangerous to the motor, but interrupts the whole system by causing a complete shut-down to local service. If circuit breakers are in service, they should be set at an amperage of 50 per cent. above motor "amperage," and, under no circumstances, should they be **WEIGHTED DOWN.**

LUBRICATION.

If your motor must be located where it is subjected to dust, we recommend the use of dust-proof washers. These can be obtained through us or direct from the motor makers. With dust-proof washers oil in the bearings should be changed every **SIX MONTHS** (WITHOUT dust-proof washers every **THREE MONTHS**). We urge that this be done systematically, that is, by making a memorandum on a calendar. **DON'T PUT IT OFF.**

QUARRY HOIST MOTORS.

Do not lubricate collector rings with vaseline; an occasional wiping with slightly oily waste is sufficient.

We would suggest that the care of motors be entrusted to one man. Under no circumstances should motors be required to carry over loads more than 50 per cent. above their rating.

Vermont Power and Lighting Company,

Consolidated Lighting Company.

Main Office Phone, 240-2.

Marquette Office Phone, 324-4.

Reproduction of a large poster which is nailed up in a conspicuous place in all granite sheds

describing the plant of Barclay Bros. in Barre. The figures given are based on an exhaustive and very accurate test made some time ago.

The installation is as follows:

BLACKSMITH SHOP. One 5 hp., 1200 rpm. motor, driving four grindstones, and one 10 hp., 1200 rpm. motor, operating a 15" fan supplying air for eight forges.

CUTTING LATHES. One 7½ hp., 1200 rpm. motor, driving two cutting lathes, one grindstone and 24 ft. of shafting. These lathes are similar to the ordinary lathe, but equipped for handling granite shafts.

CRANES. One 20 hp., 1200 rpm. motor, driving 50 ft. of shafting and two 1000-ft. ropes from which are driven two travelling cranes with tight and loose pulleys. (These cranes are used a great deal and in the various sheds range in capacity from 10 to 40 tons. Most of them are rope-drive, but the most recent installations are operated by individual motors performing the various functions of the crane.)

SHARPENING MACHINE. One 5 hp., 1200 rpm. motor, driving trip hammer, bucket chain, plate chain, brine pump and two small emery wheels.

POLISHING MACHINE. One 15 hp., 1200 rpm. motor, driving 40 ft. of shafting and three polishing machines used in making polished surfaces on the granite.

BLOWER. One 5 hp., 1200 rpm. motor, driving blower, with 72" impeller. (The blowers are used in the winter months for blowing heated air into the sheds, as our temperature goes as low as 40 or 50 degrees below zero. Also, the sheds are usually cheaply built and cold, and it is necessary to heat them, so that the men can handle the tools.)

GANG-SAW. One 20 hp., 1200 rpm. motor, driving one gang-saw, one polishing machine and 70 ft. of shafting. (These gang-saws operate with 8 or 10 blades in a frame. The sawing process is very slow, and steel shot and carborundum is sifted along the saw edge to increase the friction.)

AIR COMPRESSORS. One 150 hp., 720 rpm. motor, driving one 1050 cu. ft. 80-lb Sullivan Air compressor to operate 50 pneumatic hand tools, two surfacers, two plug drills and one pneumatic polishing machine.



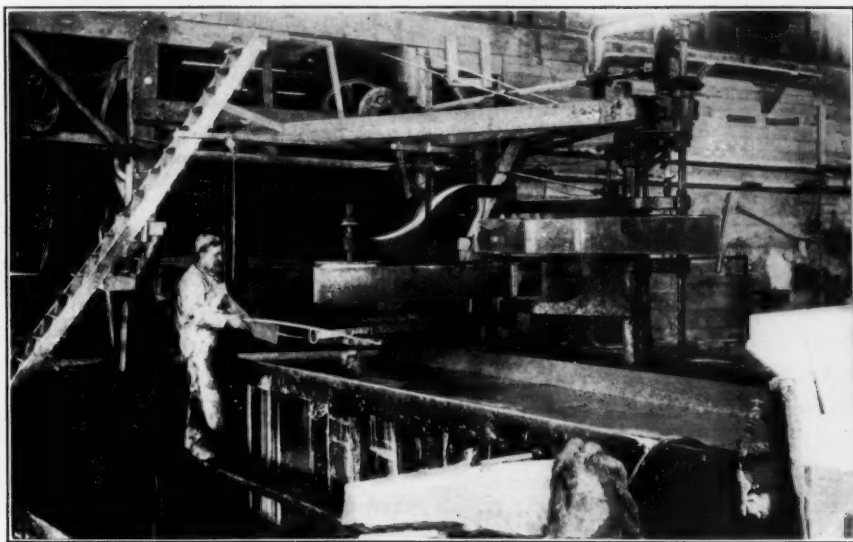
Granite Shaving Lathe, Barclay Bros. Granite Shed, Barre, Vt.

POLISHING LATHES. One 10 hp., 1200 rpm. motor, driving one double header polishing lathe, one single header polishing lathe, one 12" buzz-saw and 60 ft. of shafting. (The buzz-saw is used in cutting lumber for boxing.)

All motors are operated on alter-

nating current, 3 phase, 60 cycles, 220 volts. This shed is one of the largest and most complete granite plants in the country, and is equipped with the most modern types of machinery.

Very few of the plants use motors



Machine Used for Polishing Granite, Barclay Bros. Granite Shed, Barre, Vt.

with individual drive. All of the older sheds, those put in prior to three years ago, have but one or two motors and operate with shafting and belts, but we have discouraged this and our customers are beginning to appreciate the advantages of individual and group drives.

We have on our lines some 89 granite sheds and 10 quarries, and as a further illustration of the character of such business, both as to load factor and income, the accompanying table is interesting. The figures are taken from a data sheet covering six months' power business and computed on the basis of an 8½ hour service, 25 days in the month. The installations are chosen at random.

These calculations are based on the rating of the motor, and in a good many cases are affected by overloaded motors, as this is not uncommon. I recall one instance where a 40-hp. motor carried 98 hp. steadily on an air compressor.

In addition to our quarry and shed load we have 13 motors on our lines, aggregating 268 hp. and furnishing power to diversified industries. Our average load factor for all power business is 52%. The average load for the granite manufacturers only is 69.7% and for the quarries 43%, low because of the hoists.

In spite of these figures, we have not developed the use of electricity in the granite industry to the degree which we should have liked, since for the last two years we have lacked capacity during the power period. There is several hundred horse-power in the Barre sheds and probably

several thousand more in the quarries still furnished by steam, which can undoubtedly be swung over when we are ready.

We also contemplate a reorganization of our rate system which now ranges from 4 to 2 cents per kwh. and does not afford us sufficient protection in some cases. In a com-

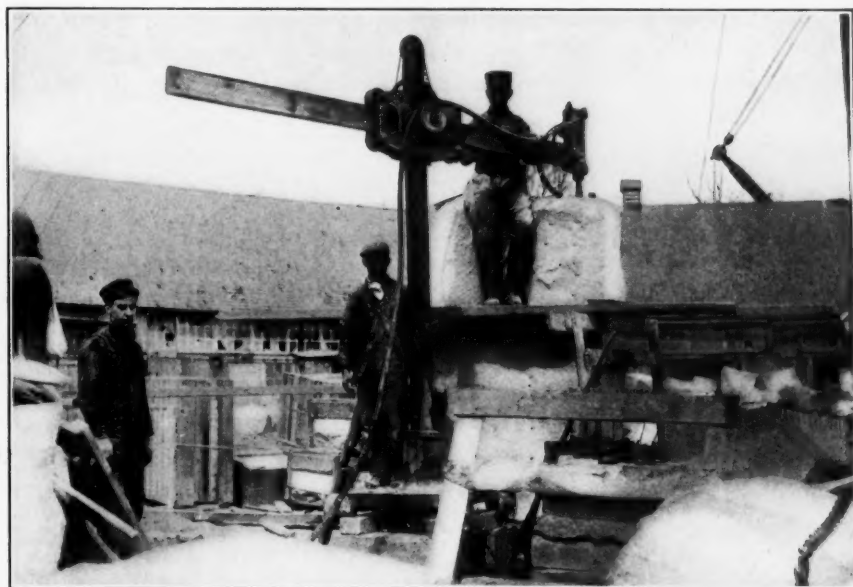
	Hp. Inst.	Kwh. used in 6 mos.	Rate Per Year per hp. Inst.	Per Cent Load Fact.
Granite Mfg..	50	47890	37.99	92
Granite Mfg..	30	23260	31.00	75
Granite Mfg..	40	34370	34.37	83
Granite Mfg..	20	18650	37.30	90
Granite Mfg..	75	51860	27.65	67
Granite Mfg..	25	21280	34.04	82
Granite Mfg..	75	45600	24.30	58
Granite Mfg..	174	99170	22.22	55
Granite Mfg..	55	39380	49.26	69
Granite Mfg..	60	56980	36.40	92
Granite Mfg..	20	19560	39.76	94
Granite Mfg..	15	12580	36.60	81
Granite Mfg..	40	36979	35.96	89
Granite Mfg..	50	44430	23.73	86
Granite Mfg..	40	37770	44.22	91
Quarry	30	6050	33.87	19
Quarry	40	11440	15.87	27
Quarry 20 Hp. Grout car, 59 Hp. Hoist....	75	38880	29.00	50
Quarry 150 Hp. Air com- pressor	229	137581	32.55	58
Quarry Inst. 3 Mo.....	5	806	18.00	30
Quarry	10	10100	65.39	98
Quarry Inst. 4 Mo.....	36	6920	16.60	57
Quarry Inst. 4 Mo.....	106	13890	17.65	38

Table showing consumption and load factor of 23 granite quarry and shed installations

munity where the bulk of the business is dependent on a single industry, the power company must make provision for contingencies such as strikes and business depressions affecting that one industry. This is especially true where the Union is dominant, for the eggs are all in one basket and the basket is bound to drop occasionally.

Our power increase from May 1, 1905, however, has been very gratifying, for the load has grown from 758 hp. on the lines of the Consolidated Lighting Company at that date, with 1000 hp. added with the taking over of the Vermont Power & Lighting Company on February 1, 1907, to the aggregate total of 4648 hp. on December 1, 1909. This figures about 1.6hp. per capita of popu-

not be apparent at first glance. The granite industry is absolutely dominated by the Union, and Union regulations permit of but eight hours work a day both in the quarries and in the sheds, the hours being from 7 a. m. until 4 p. m. with an hour off at midday. We find ourselves, therefore, in a position exactly the reverse of that of the ordinary central station, for in a city of this size it is



Granite Surface Cutter operated by compressed air from motor-driven compressors. Every shed has from two to five of these machines. Photographed at Barclay Bros. Granite Shed, Barre, Vt.

lation, and the comparison of our connected motor load with that of leading New England manufacturing cities is interesting:—

City	Population	H. P. Con'd	No. Serv'd
Haverhill,	37,000	2416	15
Lowell,	110,000	5071	28
Lynn,	89,000	2914	30
Springfield,	86,000	3692	23
The community we serve.	29,000	4648	6.2

There is one serious drawback to our situation, however, which may

extremely difficult to work up new uses for night service.

A big power market in a small community has many disadvantages, varying greatly, of course, with local conditions. A large equipment with its correspondingly large fixed charges and operating costs must be installed and carried to serve power, with lighting as a by-product; and when up-to-date methods have drawn in all the lighting business available.

two-thirds of the capacity will still be idle at night with no further market in sight. A two-hour lighting load at 15c per kwh. brings in more revenue than an equal eight or nine-hour power load earning from 2 to 5c per kwh.

We have always made a practice of selling motors to our customers, though we have made it optional whether they buy from us, through supply houses or direct from the manufacturer. We find, as a rule, however, that the customer prefers to purchase a motor from the central

electricity can afford, and in the last three years have put out over 1500 flatirons, among some 2000 domestic customers. This heating load operates on a 10c rate.

We generate our electricity in three different plants. The Bolton Falls plant with a capacity of 4200 hp. is 17 miles from Montpelier, and the Middlesex plant with 2400 hp. is six miles from Montpelier; both being water power plants located on the Winooski River, which has a drainage area of 970 square miles. The Middlesex plant also has 1100



Bolton Falls Plant, head 50 feet, spillway 194 feet

station, as he then feels that the company is responsible for its proper performance, and we sell the motor, delivered, erected and connected. For everything over 20 hp. we insist on the installation of an automatic oil switch as we find that in a granite plant, where 100 men may be working at an average wage of 40c an hour, it is expensive to shut down while putting in new fuses. Though, obviously, we are not over-anxious to swell our day load, still we have felt it our duty to extend to the public every convenience that

hp. in steam auxiliary machinery. The third is an auxiliary steam plant located in Montpelier and has a capacity of 3000 hp. This plant is operated only in low water periods and in times of accident, being used mainly as a substation for distribution in Montpelier. In Waterbury, Barre and Graniteville, we have other substations, containing step-down transformers and switchboard apparatus. The total generated output of our properties is over 8,000,000 kwh. per annum.

The Three Voltage Rating of Mazda Lamps

THE Mazda incandescent lamp when operated at an efficiency of 1.25 wpc. has proven itself far more economical than either carbon, gem, or tantalum lamps on all costs of energy above a few cents per kwh. There are some cases, however, in which the cost of energy per kwh. is very low, perhaps a small fraction of a cent, and where a cheaper and less efficient lamp may show greater economy in operating expense than the Mazda lamp operated at 1.25 wpc. The somewhat higher renewal expense of the latter lamp at this efficiency may not be counterbalanced by even a great reduction in the amount of current used where the current is cheap, and since the Mazda incandescent lamp is inherently of higher efficiency and quality, the question of its economical application to any particular case merely depends upon its operation at the correct efficiency.

In the case just cited a small sacrifice in efficiency of the Mazda lamp could be made in order to reduce the renewal expense and thus secure greater economy than could be obtained with the other types of lamps even on very cheap power. Also, besides the actual saving in current made possible through the use of the Mazda lamp there is the very important possibility of releasing generating capacity, which even where the operating cost is low, may often be of great value. This point should not be overlooked in deciding the relative economy of high efficiency versus low efficiency lamps.

The incandescent lamp manufac-

turers have recently made a radical change in their methods of rating these lamps, in order that they could be used with greater economy under those certain conditions, where heretofore their cost of operating exceeded that of a less efficient type of lamp which is valuable in cases where the cost of electrical energy is low. The new method of rating called the "three voltage plan" is based upon the fact that for any given set of conditions, depending upon the cost of energy and cost of lamp, there is one particular efficiency and life at which it is most economical to operate a given lamp. Each Mazda lamp is labeled with three voltages two volts apart, as for example:

114

112

110

called top, middle, and bottom voltage respectively. This method of rating makes it possible for a customer to select the particular efficiency of lamp he wishes to use by specifying that either the top, middle, or bottom voltage, as the case may be, should be the same as that of his lighting circuits.

When burned at top voltage the Mazda lamp has the highest efficiency or consumes the least energy for the light produced, and gives life of 1000 hours. At middle voltage more energy is consumed per candle-power produced and the life is lengthened (due to operation at a lower temperature) to 1300 hours. At bottom voltage the lamp is operated at lowest efficiency and gives

a life of 1700 hours. It is obvious that the relative cost of lamp and energy will determine the most economical life and efficiency since if energy is cheap the saving in energy obtained by operating the lamp at high efficiency is not sufficient to counterbalance the higher resulting renewal expense. On the other hand, if energy is relatively expensive then it will be desirable to operate the lamp at a high efficiency, since the saving in current at the higher rate will more than pay for the increase in renewal expense.

The efficiency of the different sizes of lamps at top voltage is not the same, since the larger lamps are relatively longer lived than the smaller ones, and, in order to give all sizes a uniform life of 1000 hours at the top voltage it was necessary to operate the 25-watt lamp at 1.33 wpc., the 40-watt lamp at 1.25 wpc., the 60, 100, and 150-watt lamps at 1.20 wpc., and the 250-watt lamp at 1.15 wpc. The advantage of the new plan will be apparent by referring to the Table No. 1 showing the cost of producing light with Mazda lamps. This table is based on list price of bowl-frosted Mazdas, and shows the total cost of operating the several sizes at top, middle, and bottom voltage with costs of energy from 1c. to 20c. per kwh. The total cost given in the table includes the cost of the energy consumed and the renewal expense involved in the production of a quantity of light equivalent to 100,000 lumen hours (which is equal to about 10,200 mean horizontal candle hours in the case of the Mazda lamp).

In order to see how the most eco-

nomical efficiency varies with the cost of energy refer to Table No. 1 and consider, for example, the cost of producing 100,000 lumen hours with a 60-watt Mazda at the top, middle, and bottom voltage with energy varying from 1c. to 20c. per kwh. With the 60-watt lamp and with energy at 1c. per kwh. 100,000 lumen hours can be produced most cheaply if the lamp is operated at the bottom voltage. The difference between the cost at top and bottom voltage with this cost of energy being about 19%. At 5c energy the bottom voltage is still the cheapest, but is now only about 3% cheaper than at top voltage. At 8c per kwh. the top and middle voltages are as cheap as the bottom voltage, and above 8c the top voltage is the most economical.

Where the per cent saving possible to obtain by operation at bottom voltage is slight, as for example is the case just considered with energy above 5c per kwh., it is far better to use the lamps at top voltage and thus secure not only a better quality of light but more light from a lamp of a given size as well. The greatest benefit can be derived from the three voltage plan, however, on the low costs of energy, where operation at bottom voltage will then show economy for the Mazda lamps over either carbon, gem, or tantalum down to energy costs as low as 0.2c per kwh.

Table No. 2 shows the comparative cost of producing 100,000 lumen hours with carbon, gem, tantalum and Mazda lamps with costs of energy from 0.2c to 1c per kwh. This table is based on conservative total life values of the carbon and gem

Table Showing Total Cost of Producing Light with Tungsten Lamps at Top, Middle and Bottom Voltages or Various Costs of Power

Nominal watts	25		40		60		100		150		250	
	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle
Nominal c.p.	20		32		48		80		120		200	
Voltage	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle
Watts per candle	1.33	1.39	1.45	1.25	1.30	1.35	1.20	1.25	1.30	1.20	1.25	1.30
Actual watts	25.0	24.2	23.3	40.0	38.9	37.8	60.0	58.0	56.5	100	98.0	94.2
Actual c.p.	18.8	17.4	16.1	32.0	29.9	28.0	50.0	46.5	43.5	83.3	77.6	72.4
Total lumens	184.2	170.5	157.8	309.8	289.4	271.0	490.0	455.7	426.3	816	760	710
Lumens per watt	7.36	7.05	6.77	7.74	7.44	7.17	8.16	7.86	7.54	8.17	7.84	7.54
Hours life	1000	1300	1700	1000	1300	1700	1000	1300	1700	1000	1300	1700
Kwh. cons. per 1000 hrs.	25.0	24.2	23.3	40.0	38.9	37.8	60.0	58.0	56.5	100	98.0	94.2
Cost of Frosted Lamp	\$0.75	\$0.75	\$0.75	\$0.85	\$0.85	\$0.85	\$1.17	\$1.17	\$1.17	\$1.55	\$1.55	\$1.55
Lamp renewals p. 1000 hrs	.75	.58	.44	.85	.65	.50	1.17	.90	.69	1.55	.91	.91

Combined Cost of Power and Lamp Renewals per 100,000 Lumen Hours in Dollars

VARIABLE COST OF POWER PER K. W. H.	1		2		3		4		5		6		8		10		12		16		20	
	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle	Top	Mdle
1	.54	.48	.43	.40	.36	.32	.36	.32	.29	.26	.31	.28	.26	.23	.27	.25	.23	.20	.18	.16	.14	.12
2	.68	.62	.57	.53	.49	.46	.48	.45	.43	.41	.39	.39	.37	.36	.35	.33	.31	.28	.26	.23	.20	.18
3	.81	.76	.72	.66	.63	.60	.61	.58	.56	.54	.52	.51	.50	.49	.48	.46	.44	.41	.39	.37	.36	.35
4	.95	.90	.87	.79	.76	.74	.73	.71	.69	.68	.67	.66	.65	.64	.63	.62	.61	.60	.59	.58	.57	.56
5	1.09	1.04	1.02	.92	.90	.88	.85	.83	.82	.80	.80	.79	.79	.78	.77	.76	.75	.74	.73	.72	.71	.70
6	1.22	1.18	1.17	1.05	1.03	1.02	.97	.96	.96	.93	.92	.91	.92	.91	.90	.89	.88	.87	.86	.85	.84	.83
8	1.49	1.47	1.46	1.31	1.30	1.30	1.22	1.22	1.22	1.17	1.19	1.19	1.16	1.17	1.16	1.15	1.14	1.13	1.12	1.11	1.10	1.09
10	1.75	1.75	1.76	1.57	1.57	1.58	1.46	1.47	1.49	1.42	1.45	1.46	1.41	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34
12	2.03	2.04	2.05	1.82	1.84	1.86	1.71	1.72	1.75	1.66	1.70	1.72	1.65	1.68	1.72	1.68	1.67	1.66	1.65	1.64	1.63	1.62
16	2.57	2.59	2.64	2.34	2.37	2.42	2.20	2.23	2.28	2.15	2.22	2.25	2.14	2.19	2.25	2.20	2.19	2.18	2.17	2.16	2.15	2.14
20	3.12	3.16	3.28	2.86	2.91	2.97	2.69	2.74	2.81	2.64	2.73	2.78	2.63	2.70	2.88	2.61	2.69	2.73	2.68	2.63	2.58	2.53

REDUCTION FACTOR: 25-60-100-150 WATT LAMPS = 78%.
40-250 = 77%.

lamps in place of the usual useful life, since, practically all lamps are left in service until ultimately burned out, rather than till they drop to 80% of initial candle-power. The Mazda

lamps have all been taken at bottom voltage, and the gem lamp has been figured in the same way, as this is the most economical voltage for such low costs of energy. The average

candle-power and watts during the life values shown have been taken in every case rather than the initial values. This has been done because the Mazda lamp maintains its candle-power much better than the other types, which is a distinct advantage in its favor and should be considered in comparing it with other types of

becomes so small as to be negligible in comparison with the better quality of light obtained at the higher voltage. Only in those cases where energy is very cheap should anything but top voltage be seriously considered. For ordinary use on central station circuits on the usual central station rates, top voltage

TABLE No. 2

Comparative Cost of 100,000 Lumen Hours, Carbon, Gem, Tantalum, Tungsten Lamps, With Energy Below 1c Per K. W. H.											
RATING	CARBON		GEM	TANTALUM	TUNGSTEN						
	16 cp.	16 cp.	20 cp.	20 cp.	25 w.	40 w.	60 w.	100 w.	150 w.	250 w.	
	3.1 w.p.c.	3.5 w.p.c.	Btm. Vltge	2 wpc D. C.	Bottom Voltage						
Actual initial c.p.	16	16	16.7	20	16.1	28.0	43.5	72.4	108.6	188.0	
Actual initial watts	49.6	56	47.3	40.0	23.3	37.8	56.5	94.2	141.2	235.0	
Nominal w.p.c.	3.1	3.5	2.83	2.00	1.45	1.35	1.30	1.30	1.30	1.25	
Hours life	800	1700	1450	1200	1700	1700	1700	1700	1700	1700	
Ave. c.p. during life	13.20	13.06	14.00	21.66	16.46	28.30	42.60	71.50	107.2	179.7	
Ave. watts during life	48.6	54.9	40.2	41.0	23.9	38.6	55.6	92.6	138.8	241.3	
Reduction factor	82.5	82.5	82.5	79.0	78	77	78	78	78	77	
Lumens	138	135	145	215	161	274	417	701	1051	1739	
Cost of lamp std. pkg.	\$.18	\$.18	\$.225	\$.405	\$.567	\$.648	\$.891	\$1.175	\$1.701	\$2.430	
COST OF POWER CENTS PER K. W. H.	.2c	\$.233	\$.160	\$.162	\$.195	\$.237	\$.167	\$.152	\$.125	\$.122	\$.110
	.3	.269	.200	.190	.214	.252	.181	.166	.138	.135	.124
	.4	.303	.241	.218	.233	.266	.196	.179	.151	.148	.138
	.5	.339	.282	.246	.253	.281	.210	.192	.165	.161	.152
	.6	.374	.323	.273	.272	.296	.224	.206	.178	.175	.166
	.8	.445	.404	.329	.310	.326	.252	.232	.204	.201	.193
1.0	.515	.485	.384	.348	.355	.280	.259	.231	.207	.221	

lamps. The costs of lamps taken in this table are those for clear lamps in standard package quantity.

For energy costs above 5 or 6 cents any percentage saving that it is possible to obtain by operating the Mazda lamps at other than top voltage should always be used. The prime object of the three voltage plan, as applied to Mazda lamps, was to widen the field of its commercial application by making it competitive with the cheaper and less efficient lamps on low cost of energy.



Applying the "Light of Welcome"

What Electric Advertising Means to the Hotel

BY EARL E. WHITEHORNE

I WAS talking to a hotel man one evening in a small city in the West, and asked him why he did not take advantage of the powers of electric advertising—why he did not brighten up his building with a large sign and some display lighting.

"Well you see," he said, "I really don't need much of a sign. I've got a good location, and the best hotel in town, and all the travelling men know where I am and come a-run-nin'. The transient trade doesn't amount to much, you know. I don't see where it would pay me to spend more money that way."

That is the attitude of a good

many hotel men, but though the electric advertising man can almost invariably prove that it is short-sighted and wrong, the reasons why are not so self-evident, nor the conversion of the unbelievers as easy as might be expected.

The best profits in the hotel business come from the travelling man, and the travelling man knows his hotel. The new salesman on a territory invariably inquires as to the best hotel of his predecessor, or finds out from a fellow traveller, lest he come to discomfort in the wrong house. And so the reputation of a good hotel goes down the line from mouth to



A hotel in Denver, Colo., with three large signs. Conclusive evidence that the hotel sign "pays its way"



Hotel sign in Knoxville, Tenn., suspended across the street. This sign dominates this street for blocks

mouth developing a steady, permanent trade; for the man "on the road" finds a deal of solace in the bell boys who jump for his grip as he comes through the door with an "Evenin', Mr. Jones," and in the

familiar clerk behind the desk who greets him with a "Hel-lo, Mr. Jones, we've got some mail for you!"

When the evening train pulls into a "good hotel town," and the grip-laden travelling men drop off and



Terminal Hotel, Atlanta, Ga. This sign is 48' long and the large letters are 36" high. The words "Terminal Hotel" change color continually, red, green and white. The arrow and the word "Entrance" flash every few seconds. This sign has proved very successful in drawing in new business.

make for their hotels, they are usually a pretty tired lot. Behind them is a hard day's work, worry, and perhaps trunk packing, with a train-ride at the finish. Every man's mind is on his dinner and a good smoke in an easy chair. The one thing he wants more than all else is a bright, warm, cheery welcome. He is tired,

the first time—and there are of course, a goodly number—the electric sign is as welcome a sight at night as the liveried porter and the rubber-tired 'bus. He may know the name of the house he seeks, but where is it? He either asks his direction of the first man he meets, and plods on with hesitation and dis-

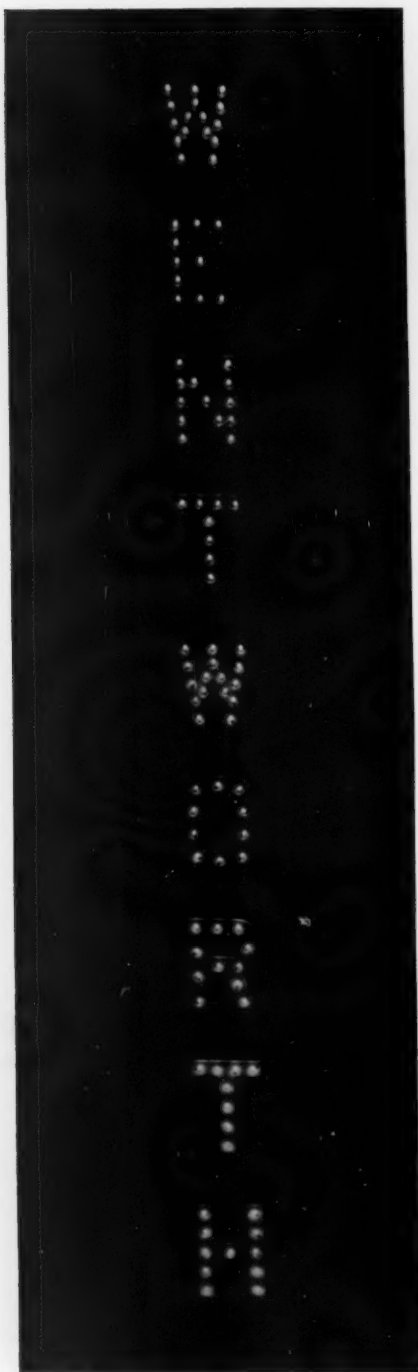


Sign on the famous Battle House, Mobile, Ala.
This shows how the artist's skill may be applied to the electric sign

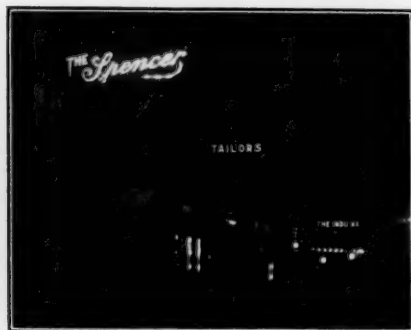
hungry, maybe cold, and sometimes he has "the blues," and to walk up to a good hotel, blazing with the light of welcome is almost like getting home. The bright, inviting exterior stands for modern, progressive methods, which in a hotel mean comfort, cleanliness, and service.

To the man who comes to town for

gust until before the very door itself, or if in Pittsburg for instance, as he walks out of the Union Depot, high against the sky line, he reads: "HOTEL FORT PITT—500 ROOMS WITH BATH". It is close by and he follows the lead confident of comfort. Or he may stop off in Columbus, Ohio, and in front



[A very effective vertical sign in Spokane, Wash.

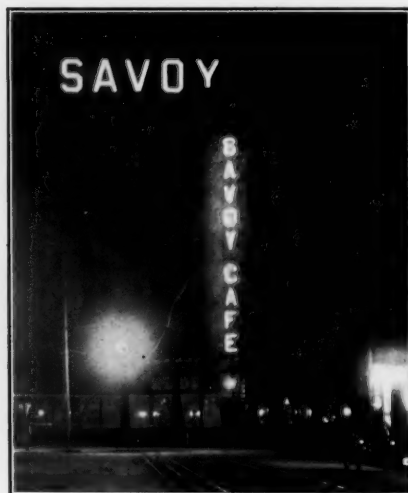


Two hotel signs in Marion, Ind.

of the station in big, bright letters shines this invitation: "HOTEL HARTMAN — NEW — FIRE-PROOF—TAKE MAIN ST. CAR" with an arrow pointing the direction. He may not know Columbus; he may never have heard of the Hartman, but he will probably take that Main Street car.

Two men sit in the Pullman smoker, watching the trees slide by. One says, "Where do you stop in Franklyn?"

"Usually at the Carter House," the other replies, "It's a good place."



A Denver hotel. Note how these signs stand out. The roof sign makes an unusually positive impression



Carriage call on Hotel Plaza. The guest receives a perforated check corresponding to the driver's number. This check is used to operate the switch which flashes the number and prevents error.

"Carter House?" says Number One, "Never heard of it. Whereabouts is it?"

"Why right on the Public Square, East Side."

"Is that the place? Well, I thought it was some third-class joint from the dingy front."

If the hotel man could spend a little time now and then riding in a Pullman, he could hear a good many things about his own business that hadn't occurred to him before. The travelling man wants a cheerful, bright-faced welcome at the end of his day; he needs warmth for his spirits as well as his body, and it is evening that features most strongly in the hotel day—dinner time and bedtime. In the larger cities, of course, the popularity of a hotel for its restaurant service means much to the prospects of the house, but

the *chef* and the *menu* may wait in vain unless the brightly illuminated sign and windows attract the diners. The same principle applies right down the line.

In cities where an unprogressive municipal government prohibits the erection of electric signs projectly over the sidewalks, some hotels have used verticle, double-faced signs, running up the side of the building and found them unsatisfactory, because the light shines into the bedrooms to the annoyance of the guests. A horizontal sign mounted on the roof can be read more easily and farther, and should cost no more. But the all-important point is sign character. To the casual observer, perhaps, a sign is a sign, easy or hard to read, attractive or not. This



A New York City sign on the corner of Broadway and 32nd St.

is not all, for electric signs, like other advertising mediums, may be good or bad. The single word "Hotel" is but a feeble attempt, but the name of the hotel itself may stand out as a hand of welcome, and show refinement and character in a single word. The best signs are the signs that are *different*—signs that impress you with their own identity.

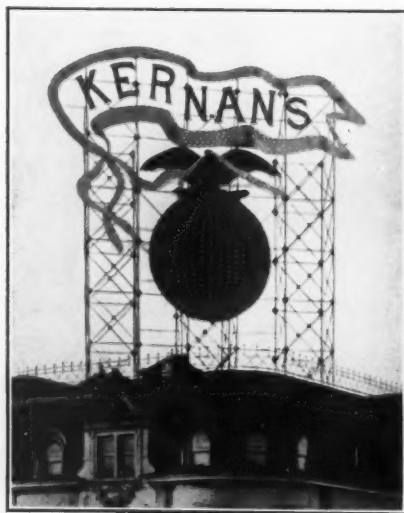
I remember a township in New York state where I saw two hotels, both having signs reading "Hotel" in letters identical in size and appearance. The effect was about the same as no sign at all, and suggested the two far-famed "hotel barkers" in Rutland, Vermont. As each train pulled into the little depot, the two old men stood side by side, and alternately delivered a sort of chant precisely the same in word and inflection, save



Hotel El Reno, Washington, D. C., decorated for the inauguration of President Taft

for the name of the hotel. "Hotel Bardwell—Get your beesness close handy by—On the opposeet corner—The Hotel Bardwell—Close handy by." Then while the first one rested the other old chap would sing out, "Hotel Burleigh—Close handy by—Get your beesness close handy by—On the opposite corner—The Hotel Burleigh—Close handy by." Since both of the hotels were about a block away from the station and not in sight, the new arrival was about as much informed as before.

When a hotel man says, "I don't know how I can afford to spend money on electric advertising," the answer is that this advertising will pay it's own way. And it will, as proved by the sixty-one electric hotel signs in the city of Denver, for instance, and the large amount of outlining displays. Some of these hotels burn two and three signs, which is an evidence of their confidence in the efficacy of electric advertising.



Electric sign on Kernan's Hotel, Baltimore. The ball is red, 25 feet in diameter and revolves constantly. The eagle is finished in gold leaf and the wings span 30 feet. The pennant is 40 feet long and waves from the eagle's mouth.

The hotel man must play his game in a big way and, since the success of his business is dependent on the growth and prosperity of the town, he should stand with the newspapers and the leading merchants for the furthering of all public progress. There is no influence so potent in the development and up-building of business activity as brightly illuminated streets.

Light affects human beings as it

does insects. Bright, cheerful streets bring out the people in the evening with a very natural result — more money spent in the evening in the stores and for amusement. And this affects the hotels in like measure.

No hotel man should look on an electric sign as an expense. It is an investment in constant publicity that pays dividends in new names on the register.



A Dollar Idea

By G. Byron Coleman, Consolidated Electric Light Co. of Maine
Portland, Maine



THIS idea is not new but it is little remembered by central station men and unknown to the majority of merchants.

When the first cold weather came I dropped in on our local merchants and suggested that they take their electric fans down off the shelf and set them to work cleaning the frost off their show windows.

This was done in a great many cases, bringing in a little added revenue and demonstrating in another way the all around utility of electric service.

New Business Methods in Glasgow and Edinburgh

BY GLENN MARSTON

GLASGOW is a municipality which has been shaken in faces of Americans so many times as a model of progressiveness that I hesitate to say much regarding its electrical development. As an example of municipal ownership, it is undoubtedly far in advance of anything in the United States. As an example of electrical development, it does not average with even moderately aggressive lighting companies.

Glasgow has a population of about 1,000,000 inhabitants. It is the second city of the British Empire, and its electricity supply department employs *one* canvasser! He has moderate assistance from the district managers of the undertaking, but there are only four of these, and they have too much to do to spend a great deal of time securing new business.

There are not a dozen electric signs in the city; of these the majority are theatrical. They are primitive and to American eyes, small. A company has just been organized to construct and maintain a talking sign on the banks of Clyde. This company will burn advertisements for those who believe in this kind of publicity.

The electricity supply department is making every effort, according to British standards, to secure the early erection of this sign. The current is to be sold to the sign company at regular meter rates.

Whenever a manufacturer is hauled into court and fined for smoke violations the canvasser immediately calls upon him and explains the advantages of electric power. The fine for smoke violation is \$25 to \$50 and the victim of such a fine is in a decidedly receptive mood when the electrical canvasser calls.

There is practically no effort to educate architects to specify electrical wiring in their plans for new buildings.

However, the canvasser regularly calls at the Dean of Guild Court, to whom all plans for new buildings or alterations are submitted, and uses his best efforts with such possible customers to secure the wiring of the buildings on which operations are being conducted.

Probably the best scheme used by the Glasgow Corporation is a tabulation of power customers. This table contains every power customer on the city's lines, classified into 113 different trades. When a pros-



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pect inquires as to the cost he is at once shown the record of the existing customer nearly approaching his own conditions. This table shows the installation of each customer in horse-power, the maximum demand during the year, the average consumption, the annual bill, and the cost per horse-power. When a prospective customer is presented with such a table of "past performances" he cannot argue as to the uncertainty of power costs.

"The people here are a good deal like sheep," said W. W. Lackie, the resident engineer, "and when we introduce power into a new industry we find many others in the same line wanting it. We try to make our customers canvass for us." But in power business Mr. Lackie's little typewritten table does more than the good words of new customers.

No supplies or appliances are sold by the city. These are handled by the contractors, who are generally on a friendly basis with the Corporation, but who do not co-operate in trying to secure business to fill in the gaps in the load curve.

On September 10th an exhibition was opened in Albert Hall, called the Scottish Model Home Exhibition—a sort of glorified food show. Both the municipal gas and electricity supply departments were represented. The electric department's booth was divided into two sections, one representing a kitchen, the other a living room. The kitchen did not contain a complete stove, but hot plates of various styles were shown, together with ovens, irons and other comparative-

ly low-priced appliances, calculated to appeal to the visitors at the exhibition.

In the living room were several of the new radiators which come to a maximum heat in less than a minute. On the center table stood a portable electric candelabra without a cord. It can be picked up and moved from one part of the table to another, and lights as soon as it is set down. There is a pad under the tablecloth made up of alternate plus and minus strips, while the candelabra is fitted with two pins in the base which penetrate the pad and perfect the necessary contacts.

A vacuum cleaner and warming pad completed the appliances in the living room. The whole booth was brilliantly lighted with tungstens and an ammeter graded in shillings and pence was used to show the difference in current cost of carbon and tungsten lamps. The exhibition is still in progress so it is impossible to say just what results came from it, but Mr. Lackie and Mr. Davis (the canvasser) both feel that it will go far toward bringing electricity close to the householder who would otherwise have no opportunity of learning its advantages.

In Edinburgh the electric department has no new business organization whatever. All canvassing is left to the contractors. The plant has a very poor load factor and makes practically no effort to better it. Last year the December peak was 11,200 kw. The maximum load outside the peak was 4,400 kw.; while the summer peak was 2,867 kw., 1500 kw. less than the off peak load in December.

The department does no advertising, it has no showrooms, employs no canvassers, and does not bother itself beyond turning the juice into the mains and collecting the bills—and there are many complaints of high bills (regardless of the low rates of which they boast) to which the reply is made that, if electricity costs too much, gas is available.

They sometimes have an electric sign in Edinburgh. This sign is erected during the Christmas holidays, and consists of five letters. I was told on good authority that it is only because the owners of the sign rent their building from the city that even this innovation is permitted. Prejudice against signs is strong both in England and Scotland, *because they frighten horses*, and this has been the chief obstacle to their introduction.

Edinburgh was one of the first places I visited and I was in a comparatively innocent state. I had a few American sign pictures with me which I showed to the manager. "My word, man," he exclaimed, "such a thing as that would never be permitted here, and if it was we wouldn't want it! It would affect our peak (see above) and we should be subject to endless damage suits for runaways and what not!" Later I learned not to inquire about signs.

Edinburgh is one of the great European publishing centres, and the bulk of the power business secured is for printing, although I could not learn what proportion of the total printing in the city was

done by electricity. The only argument for power is that it is offered at a low price. No effort is made to explain what that price really means. "If a power customer is really interested, he will find out for himself; if not, it no use for us to waste our time," is the reason given.

Tungsten lamps have not been widely introduced in Edinburgh, save for window and store lighting. Very few are sold for residence use. The department does not give advice or assistance in planning window display. Most of the lights shine full into the eyes of the passerby, being placed between the display and the spectator, *directly in the line of vision*. This is for the purpose of securing a maximum of light on the goods.

The contractors do a good deal of canvassing, mostly on lighting. There is no effort on the part of the central station to direct the canvassing along lines that will benefit the load factor. Competition with gas is very keen, as the "gas trust" (municipally owned) has a complete and aggressive new business department. This condition is almost universal in Great Britain—aggressive work by the gas interests, and procrastinating somnolence on the part of the electric departments. The electric man says, "If you want electricity you must come to me. Why, therefore, should I go to you?" The gas man says, "You have your choice of gas, electricity or other things. Give me a chance to show you what you can do with gas." And the gas man wins.

The Storage Battery and its Application to the Electric Vehicle

JULIAN N. WALTON, STORAGE BATTERY AND ELECTRIC VEHICLE EXPERT
EDISON ELECTRIC ILLUMINATING CO., BROOKLYN, N. Y.

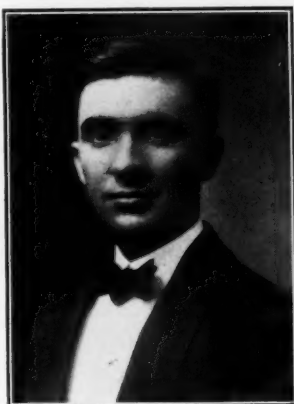
CONSIDERABLE dissatisfaction exists among some users of electric vehicles, due to the fact that these vehicles have not met their expectations or for some reason have failed to prove profitable. This is due to a very large extent to inexperience on the part of the owner of the car and his failure to appreciate the necessity for the proper care of batteries. Recent investigations into the electric vehicle conditions in Brooklyn, have shown that 95 per cent of all cases of dissatisfaction have been due to the behavior of the storage batteries.

Before going into conditions as they have been found, it might be well to state that the campaign of education has to deal with far more than the proper methods of charging batteries. The need, more than anything else, is to thoroughly impress upon the users of electric vehicles, the importance of keeping the electrolyte of their batteries free from impurities, as this is really the principal cause of battery failure. In diagnosing battery troubles, all failures are too apt to be attributed to overcharging or sulphating. In fact, there are few other well-known

reasons for explaining the failure of batteries, these two causes being held responsible for buckling, growing, excessive shedding of active material, loss of capacity, etc.

Overcharging and abnormal sulphation are usually secondary evils which are caused by the introduction of impurities in the electrolyte.

In order to make the above statement clear to all, it will be necessary to cite the case of a new battery which, say, has a capacity sufficient to propel a vehicle thirty-five miles. This mileage has been accomplished and the owner of the vehicle grows to expect it each day from his battery. The specific gravity of the battery has to be equal-



Julian N. Walton

ized and the water lost by evaporation replaced. This the attendant is ordered to do. He consults his instruction book and finds he must use distilled water, but he has none at hand. He reasons that hydrant water is good enough to drink and therefore it is good enough for the battery. In it goes, carrying with it many impurities, which begin their work on the plates, and down goes the capacity of the battery. The owner, knowing that previously the

battery had been of sufficient capacity to propel the vehicle thirty-five miles, endeavors to do so again. He no longer has his original capacity, consequently, before he realizes it, he has discharged his battery below the 1.8 volt mark, and has formed this excessive and insoluble sulphate.

He comes back to the garage and accuses the attendant of not having charged the battery thoroughly, and orders him to give the battery a long overcharge. The instructions are carried out, but the owner is surprised to find that this has restored but little of the lost capacity. He then decides to continue overcharging and finally, though he does not appreciate the fact, these impurities become oxidized, if they happen to be of a chemical nature, and become a lead attacking agent. This change in their nature may cause an increase in the capacity of the battery, but this is soon overcome by the rapid deteriorating effect produced. This is a simple illustration of the effect of an impurity in the electrolyte, and may seem somewhat exaggerated, but it is typical of the care which most vehicle batteries receive. Actual conditions as shown by investigations are even worse than this assumed case.

In most cases where it has been found that hydrant water has been used, those in charge when questioned have invariably replied that it is distilled water. This explains how vehicle owners are sometimes deceived. An instance is recorded of a concern operating a large number of electric vehicles who were advised by a so-called battery expert in their

employ, that Brooklyn water was even better than distilled water for their batteries. The management has since complained of short life from their batteries.

The following may serve to illustrate some of the results due to improper handling: A lady owning a runabout, ordered a new battery built to replace the one which had failed. The garage man building this battery assembled the plates in their cells ready for the developing charge. Instead of using proper lead connectors to connect the cells, copper wire was wrapped from one terminal post to the other throughout the entire battery. The acid attacked these wires and formed a heavy copper sulphate, which was carelessly allowed to fall into the cells. When inspected, the negative plates were found to be copper-plated with a heavy coat of pure metallic copper. When attention was called to this fact, the builder made the statement that copper could do no possible harm, as long as it remained on the negative plates. It has since been learned that this battery is rapidly losing capacity and requires an enormous amount of overcharge to bring it to a condition where a satisfactory mileage can be obtained.

A similar case was caused by the gross neglect of the manufacturer. The battery was equipped with copper connectors in such a way that the copper was carried into the electrolyte. This battery failed in two months, the cause being attributed by the manufacturer to improper charging by the garage attendants.

This shows the misrepresentations sometimes resorted to by the manufacturers themselves.

A garage keeper caring for several batteries had realized the importance of using distilled water in

them and for reason of economy bought his water in large quantities. He purchased several carboys of the water, and in order to return the empty carboys and collect the deposit, had the water emptied into an

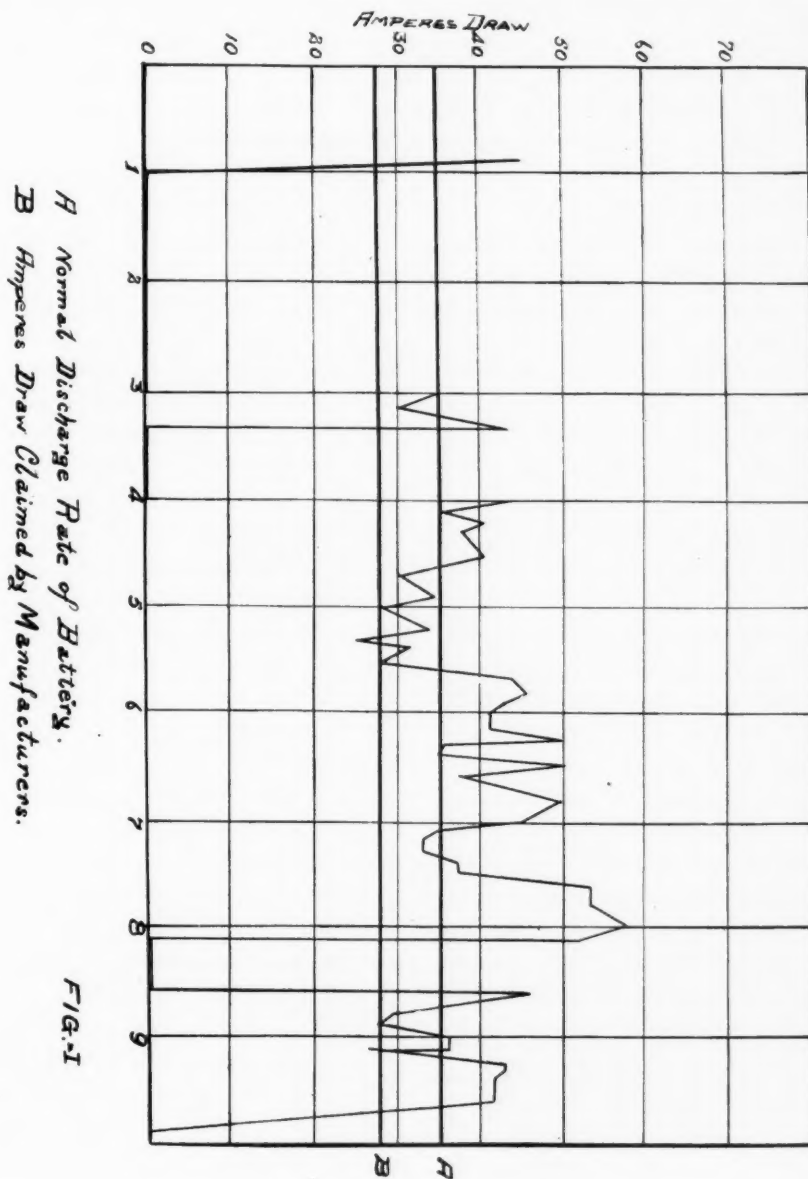


Diagram 1

old corroded gasoline drum. When a sample of the water was taken for analysis, it was found to be mud-colored, yet he was using it in all of his batteries, and was at a loss to explain why the plates deteriorated so rapidly and would not remain charged. It was also noted that an iron pipe was used for removing samples of acid from the cells for testing the specific gravity.

One case was found where acid of 1.500 specific gravity was used for replacing the water lost by evaporation, the attendant believing that he was using distilled water. This man could not understand why the specific gravity was so high.

In all probability these conditions are not alone confined to Brooklyn; in fact, a case was noted in England, where the purchaser received his battery, which had been shipped assembled, but without electrolyte. He had instructions to use pure sulphuric acid of 1.165 specific gravity. He had no sulphuric acid, so made use of common vinegar, and when the battery failed, he rushed it back to the factory, claiming that it was defective.

Knowing the above conditions exist, central stations should take immediate steps to remedy them, if the standard of the electric vehicle is to be raised. This necessitates a campaign of education. As a general rule, those who attend to batteries, especially the electric vehicle type, have little conception of the treatment the batteries should receive. They ignore the instructions given by the manufacturer, or fail to comply with them for lack of sufficient

knowledge of either electrical or chemical matters to appreciate what they mean. It is, therefore, useless to undertake to explain such matters in a technical manner, so that they may be impressed upon the garage man's mind. More satisfactory results can be obtained by imparting information by means of simple, but forcible illustrations, tending to show the importance of keeping the batteries clean and the electrolyte as free as possible from impurities, either chemical or metallic.

Very frequently plates going through the washing process are carelessly handled and set on concrete to dry. This concrete contains an abundance of iron and other impurities which plates will pick up and carry back to the cells. A good method to demonstrate this would be as follows: Take a sample of acid which tests free from iron; place a clean, dry wood-separator on the concrete floor, and pour some of the acid upon it; also pour some of the acid directly on the concrete floor. Then by applying any iron test, it can readily be seen that there is no iron present in the acid on the wood-separator, while the dense discoloration of that on the concrete floor will clearly show the presence of iron. A simple demonstration of this kind invariably leads to a better understanding of the care necessary for the proper handling of batteries and plates.

Another simple and effective method of demonstrating the importance of keeping foreign metals and their oxides or sulphates from entering into the batteries, is to take any

two dissimilar metals, or preferably any metal common around the place, and a clean piece of lead. Place the two on a board and drop a few drops of sulphuric acid between them, and by means of a low-reading voltmeter

lyte. Instances have been recorded where iron tweezers have been used for removing foreign particles from a cell, and also where a battery engineer from one of the large battery works used his pocket knife to

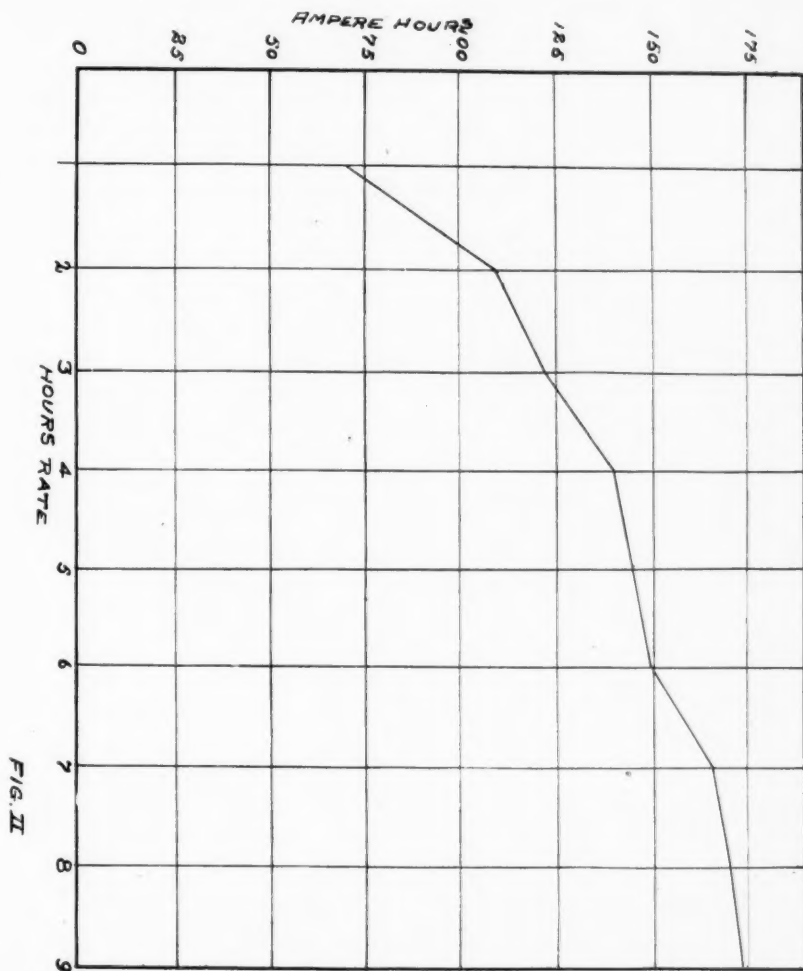


FIG. II

Diagram 2

show the difference of potential, and explain that this is what takes place in the cells. Caution users to be careful with burning irons, and not allow any foreign metal to come in contact with the plates or electro-

scrape sulphate from battery plates, also to test their hardness.

These remarks will apply to storage batteries in any class of work. Central station batteries are in some instances neglected fully as much as

the vehicle battery. Manufacturers should co-operate with one another and standardize their instructions. In many instances the manufacturer advocates the use of distilled water to prevent the introduction of impurities into the electrolyte; yet one vehicle manufacturing concern advises the washing of batteries with a soda or ammonia solution.

An instance may be cited of a man who, in his endeavor to find enlightenment about the storage battery, had consulted a very old text-book, and was actually adding to his batteries sodium compounds, to prevent sulphating. Another case was that of an undertaker who thought he could improve his batteries by adding embalming fluid to the electrolyte.

Vehicle manufacturers should also pay as much attention to the battery requisite in the design of their vehicles as to the vehicles themselves. More attention should be paid to the discharge rates under which the battery works best. The curve (Fig. 1) will serve to illustrate how the battery is abused in this respect.

This data is taken from the actual working of one of the late model vehicles; the entire machine, just previous to the test was thoroughly overhauled and put in first class condition. Here the manufacturer adapted a battery to his vehicle which was called upon to do its work at a rate far in excess of that claimed by its manufacturers, to be consistent or efficient. Owing to conditions under which vehicles have to operate, it is impossible to determine a

constant or even maximum rate at which a battery will have to deliver its energy. By giving the battery more consideration as a part of the equipment in the design of the vehicle, these conditions can no doubt be improved.

Some battery manufacturers have decreased the number of cells per battery without increasing their ampere hour capacity. When the vehicle is intended for high speed service, the horse-power required will be the same as it is in the 44-cell equipment; consequently the watts required being the same in the two equipments, the ampere discharge rates will be inversely proportional to the number of cells. As the 44-cell battery from which the data for the curve (Fig. 1) was obtained shows excessive discharge rates, it can therefore be readily understood that the battery with a lower number of cells would be discharged at a dangerously high rate. Pleasure vehicles are frequently equipped with a battery which has a normal, or 4-hour discharge rate of from 28 to 35 amperes. These vehicles when operated on high speeds actually draw from 75 to 120 amperes from the battery.

Besides the extra wear and tear produced by these abnormal discharge rates, the curve (Fig. 2) shows how the total capacity is reduced.

Manufacturers should lay stress on the fact that a battery must not be discharged below 1.8 volts per cell, rather than claiming and advertising their vehicles to cover a certain number of miles per charge.

No doubt low discharge voltages are responsible for a great deal of loss of capacity in the vehicle battery. A battery may receive the best attention as far as charging and maintaining its electrolyte pure are concerned, but discharge this battery below 1.8 volts per cell and it may lose from 10 to 35 per cent of its original capacity. This is due to the fact that an insoluble sulphate is formed after the cells are discharged below this point, and no subsequent overcharges will decompose this sulphate or restore the lost capacity.

If vehicle manufacturers insist upon claiming a maximum mileage for their vehicles, they should thoroughly advise the operator and familiarize him with all conditions which are liable to alter or prevent vehicles

from accomplishing this maximum mileage, such as soft roads, hills or grades, soft asphalt and largely temperatures.

In conclusion, it might be well to correct any impression that might have been formed that the storage battery is a delicate piece of apparatus or one which requires constant or expert attention. In reality, there are few, if any, electrical or mechanical machines which will do their work as effectively and require as little attention as the storage battery. It responds automatically to its lightest or heaviest loads.

Pay attention to its details and give it systematic attention, and the dissatisfaction which now exists will be eliminated.

[The paper was delivered by Mr. Walton as an address before the Brooklyn Company Section of the N. E. L. A.]

A Dollar Idea

By G. W. Barlow, Contract Agent
Indiana and Michigan Electric Company, South Bend, Ind.



METHUSELAH—with his 900 odd years to live, had a good deal of time to be reckless with and a good many central stations seem to go on the same principle between the time a customer puts his name on the dotted line and the time that the black spot on the disc of his meter has begun its marathon for mutual profit.

A return postal filled in by the solicitors and given to the municipal inspector each morning will eliminate much unnecessary detail and chance irritation, in cities of any considerable size, for as soon as final inspection is made the inspector drops the postal into the nearest box and within an hour or two a signed permit is on file in the office and a meter started on the way. No word is equivalent to a signed permit, and besides, at least a day is generally saved on all ordinary connections. This means a day of added revenue.

Trials of a Central Station Man in the "Show-Me" State

ACCORDING to Mr. J. E. Harsh, Commercial Manager of The Empire District Electric Company in Joplin, Missouri, when it comes to dealing with a public service corporation the man from Joplin not only has to be "shown" but requires legal evidence to file among the archives as well.

Here is Mr. Harsh's story:—

"The following incident, which created quite a little amusement in our force, and which demonstrates that those from Missouri have to be "shown," occurred some few days ago.

"One of our meter men, in attempting to remove a meter, was asked by the consumer to wait until

he could secure a photograph of the meter, showing the exact position of the dials.

"Our man patiently waited until the photographer took the picture, when he was permitted to complete his work."

We suppose that if Mr. Harsh was a Joplinite himself, he would have had another photograph taken to prove the reading of the dials when the meter was reinstalled so the consumer could not send in a trained spider to turn the indicators back from the first reading.

P. S. Perhaps it would be safer to have the photograph copyrighted also.

A Recent Roanoke (Va.) Ad.

FIRE!

REPRINT FROM

ROANOKE TIMES

Saturday, November 20th, 1909

FIRE FROM A GLUE POT

Damage Done, But Fire Department Arrives in Time to Save Building and Most Contents.

Fire left burning under a glue pot in the shipping room over the Palm saloon, on Salem Avenue—No. 29—yesterday morning did considerable damage, but it was covered by insurance.

Before the fire was extinguished

a great bunch of excelsior was destroyed as were many bottles and jugs of liquor. The water used by the department also caused considerable damage.

HOW IS YOUR GLUE POT HEATED?

If an **ELECTRIC GLUE POT** had been used in the shipping room described above the fire would not have occurred.

The **ELECTRIC GLUE POT** gives an absolutely even, steady heat, that keeps the glue in perfect working condition for any length of time. Connected as readily as an electric light, it can be used anywhere. Inexpensive and safe as an electric lamp.

Write us or 'phone 910.

Roanoke Railway & Electric Co.

SALES AND CONTRACT DEPARTMENT

Decorative Curb Lighting in Albert Lea

BY LUDWIG KEMPER, TREASURER AND MANAGER
ALBERT LEA LIGHT & POWER CO., ALBERT LEA, MINN.

PREVIOUS to about a year ago the city of Albert Lea was lighted by single 550-watt enclosed direct current arc lamps, at the street crossings. This, of course, furnished but meagre illumination.

About a year ago the matter of curb lighting was agitated, but met with no response from the general public, as they were not used to any high standard of illumination for the streets. We, therefore, as a preliminary step, started to introduce some bracket lighting in front of the various stores on our business streets, and for purpose of demonstration we lit up the block, in which our office is located, installing three 60-w. tungsten lamps on brackets to every twenty-five feet. We got permission from the merchants to do this, donating the lighting for three months, and making a flat rate for subsequent business, of 85c. per week, for three lamps, which included the installation, the equipment remaining our property. The lamps burned until 11 o'clock, and the rate was, of course, very low, but we did not expect to make any money on it, merely hoping to educate the

people to a better illuminated street.

The evening we turned on this bracket lighting I was out in the street with our solicitor, and great deal of enthusiasm was shown. The block that was lit up was known as "Smoky Row," and it always had been rather dark; now, however, with the bracket lights it was the brightest block in town. During that evening we closed up contracts with about twenty to twenty-five stores, and the following Monday we closed more. These lamps were installed immediately, and as a result, some of the stores showed good front illumination, where others were

dark. At the same time, though we could not get this system into general use, it showed the people that considerable improvement in street illumination could be made.

From time to time other customers would drift in, but we did not push this system very hard, as we had enough brackets out to show an improved lighting of the street, and furthermore, the cost of lamp renewals on this scheme was very high. Another objection was, that it was



Ludwig Kemper

very hard to get all the brackets in a block on an exact line, and when they were not in line, the general appearance of the street was not as good as it should have been.

About that time considerable talk came up about paving the streets, and gradually we took up the matter of curb lighting again. We were favored with a very progres-

sion gradually received more and more favorable consideration.

It was argued that where the merchants did not want to pay for this lighting personally, they thought it would be a very good proposition, if the city at large paid for them, and after considerable hard work, the council finally accepted our proposition, and we made a contract



Daylight View of Decorative Curb Lighting, Albert Lea, Minn.

sive council, and when we found out that nothing could be done with the individual merchants, efforts were directed towards the council. We tried to convince them, that wherever they were going to pave, a curb lighting system would greatly improve the looks of the streets, and bring the people out at night with a resultant betterment of business conditions. There was but little interest shown in the beginning, but after we put up a sample post, the enthusiasm rose about 500%, and by working constantly on the matter, with the various councilmen and some of the merchants, the propo-

sition gradually received more and more favorable consideration.

The equipment was installed on November 6th, and consisted of Cutter "O" suburban posts, set 88 ft. apart on each curb. The width of the street is 99 ft. with 16-ft. sidewalks. The poles are fitted with single sidearms bearing a 60-w. tungsten lamp, and another outlet at the top, mounting a 40-w. tungsten lamp. The lamps are inclosed in 13-in. alabaster globes. The side lamp over the roadway burns all

night, but the lamp on the top of the pole is turned off at midnight. The wiring is run in 1-inch conduit laid in the curb, with feeders run in conduit through basements to nearby poles.

The cost of the installations figured \$60.00 per pole, complete with conduit, but exclusive of taking up and laying down sidewalks. The revenue derived from the installation will be \$45.10 per pole per annum.

To sum up, we simply handled the case as follows:—

First—By educating the people

cities are only about 100 miles north of us, most of our merchants were acquainted with the installations in both towns.

The installation has been completed and in use for several weeks now, and the enthusiasm of the public has not gone down, but has rather increased. There are several petitions before the council now, to have this system extended to some of the other streets, but we do not expect any action in the matter before spring.

On the night that this installation



Night View of Decorative Curb Lighting, Albert Lea, Minn.

to a better system of illumination of streets.

Second—By using the right argument at the proper time, when the city was booming.

Third—By making a free trial proposition to the merchants. This free trial consisted first of a few brackets, and later of single posts. Both aided us materially, and without these demonstrations we feel that we might not have won out.

One of the good arguments we advanced, was the known benefits derived from the curb lighting in St. Paul and Minneapolis, for as these

was turned on, we engaged a band to play on the street, and keep the people in good humor. Several of the merchants had put up display lighting, and a number of them gave away souvenirs. The opening therefore was quite a festivity, and was attended by everybody in town, and by several hundreds of people from other towns. Some of them came as far as a hundred miles to attend the opening and see the new lights turned on. Taking it all together, we think the installation is a success, both for the city and for our company.

A Dollar Idea

By Frank Houghton, Solicitor
The Cleveland Electric Illuminating Company



I HAVE used the following leaflet to awaken an interest in prospective customers so that I may get a chance to *talk* electricity.

The scheme has worked well and has accomplished its object. It gets me a chance to get inside the door and answer questions. This has led to the closing of orders that I do not think I could have secured in any other way.

I call on a number of prospective customers one day and leave a circular to do my talking for me. I call again the next day to get the effects, and if possible close a contract.

The rates are figured out on the 2-rate basis of 12½ and 5c per unit for light and power on the same meter or for 6¼c where power only is used.

All utensils used in the home where a regular lighting contract is taken are charged for at the rate of 5c per unit and are not included in the "rating."

The leaflet reads:

What One Dollar's Worth of Electricity Will Do

Five 16-candle power Edison lamps burn 1 1-2 hours every day for one month for ONE DOLLAR.

An eight C. P. Edison lamp, used as porch light, will burn three hours each day for six months for ONE DOLLAR.

A heating pad can be used all night every night for a month for ONE DOLLAR.

An electric flat iron will do the family ironing for two months for ONE DOLLAR.

An electric radiator will heat the bathroom one hour each day in the month for ONE DOLLAR.

A 12-inch fan can be run all day every day in the month for ONE DOLLAR.

A sewing-machine will run five hours for a cent.

A washing-machine will run four hours each week for five months for ONE DOLLAR.

The Grocer can burn five 16-candle power Edison lamps one hour per day and grind 500 pounds of coffee in one month for ONE DOLLAR.

The Butcher can burn five 16-candle power Edison lamps one hour per day and chop 1200 pounds of meat in one month for ONE DOLLAR.

The Blacksmith can use a forge blower five hours each day for a month for ONE DOLLAR.

The Confectioner can freeze five gallons of ice cream each day in the month for ONE DOLLAR.

OF COURSE

If you use more electric light it will cost more.

BUT

The more you use the cheaper it gets.

The Application of Central Station Service to the Prevention of Industrial Accidents

THE Fidelity and Casualty Company of New York, one of the largest accident insurance companies in the country, has recently issued a book entitled "The Prevention of Industrial Accidents." This pamphlet is divided into such sections as Care on the Part of Employers and Employees, Safety Devices, Steam Boilers, Engines, Electrical Apparatus, Elevators, The Factory, Wood-Working Machinery, and gives specific detailed suggestions and advice on the various preventative measures which may be the means of saving loss of life, and physical injury as well as loss of efficiency in the operative and thereby a decreased output and resultant loss of profit. Under the department headed, "Care on the Part of Employers and Employees," these sections are of particular interest to the central stations.

PHYSICAL SURROUNDINGS.—Not only the safety of workmen, but the maximum output of the plant, are promoted by making the physical surroundings of the workmen as comfortable as possible. Plenty of light, good air, safety, and comfort pay in a financial sense.

INSUFFICIENT LIGHTING.—Statistics show that the greatest number of accidents occur during the months of diminishing light. Dirty windows and insufficient artificial illumination often make condi-

tions much worse than they need be.

Great improvement in illumination may be had by white-washing the walls of a dark room at least once a year. This also saves much on the cost of artificial illumination.

OVERWORK.—Fatigue leads to carelessness and long hours of labor without rest are responsible for many accidents. Overworking workmen should be avoided wherever possible.

VENTILATION.—A continuous supply of pure air is, no doubt, of greater importance from the standpoint of maintenance of health than it is from the standpoint of prevention of accident, but the two are related. Whatever lowers the vitality of the workman, decreases his alertness and watchfulness to avoid accident. Impure air, gases, vapors, dust, and smoke, therefore, all increase the chances of accident, in addition to imperiling the health of workmen.

Again further along under "The Factory" is this:—

"Don't use long flexible cords, and don't shorten or adjust cords by looping them over nails or the metal parts of machines. Paper shades should not be used."

As a result of a large amount of direct-to-the-mill advertising, which has been sent out of late by manufacturers of lamps and reflectors, the practical factory man, the man who is responsible for plant output and production costs, is gradually awakening to the importance of factory illumination, not mere light of indifferent character and placement.

It is a new idea to the manufacturers, in the majority of cases, for the influence of illumination on the output of a factory has been little thought of in the factory itself. And now, as this phase of the matter is gradually impressing itself on the mind of the manufacturer, comes this warning from the insurance authorities, a new side-light on the subject of illumination which affects him vitally in another quarter—*"Statistics show that the greatest number of accidents occur during the months of diminishing light."*

There has, of course, been a natural objection to factory lighting, which has prejudiced many central stations against it, for factories are often far distant from the station, and the load factor is in many cases bad. But if proper illumination will do all this for the factory operator:—

Decrease loss from spoilage.

Increase output through greater efficiency of operatives.

Reduce the liability of accident.

Can the central station afford to longer disregard this field?

The proposition, of course, must be advanced strictly on a more-profit-to-you basis, and worked up from the mill man's view-point, for he must see the application himself, in his own plant. A man cannot go to the superintendent of a mill and talk watts, and lumens, and foot-candles, and photometric curves. He is not interested. But he is vitally concerned with the amount of spoilage and the morale of his employees, and if you can show him how and where he can increase the capacity of his machines and raise the efficiency of his operatives, you compel his attention.

Take this proposition on its own merits and in addition demonstrate that by the use of proper reflectors and tungsten lamps, the lighting cost may be cut down; and cite the further argument that insurance companies themselves recommend and urge a greater attention to illumination as a surety against accident, and the case is a strong one.

Unrecognized opportunities are oftentimes close at hand and ready to serve. For a good many central stations this may be one of them.



A "Count the Tungstens" Contest in Dayton

THE reputation of the Dayton (Ohio) Lighting Company as an originator of novel and effective advertising schemes is still growing.

A few weeks ago a prize guessing

contest was announced and notices of the offer were strewn broadcast. The announcement was gotten up in very attractive form being printed in bronze on a dark gray paper.

The text was as follows :

WHO Can Answer This Question ?

TEN DOLLARS TO YOU IF YOU DO



How many Tungsten electric lamps are there in the retail stores on Main Street between the river bridge and railroad?

To the first person who delivers the nearest correct answer to the question given above, the Dayton Lighting Company will pay the sum of TEN DOLLARS IN GOLD



Conditions Employees of The Dayton Lighting Company can NOT take part in the contest. No answer will be accepted until 8 p. m., SATURDAY EVENING, NOVEMBER 20th

Note If you do not know what a Tungsten electric lamp looks like, notice our display window at corner of Fourth and Ludlow Streets or come in and we will explain. Just count the lamps as you go shopping, you may win the money

The Dayton Lighting Company

COMMERCIAL BUILDING :: :: DAYTON, OHIO



Windows of The Dayton Lighting Company

The windows of the Dayton Lighting Company's office were decorated as shown in the photograph, and a

great amount of popular interest was aroused. Three hundred people submitted figures, and the prize awarded.

A Dollar Idea

By Roy G. Munroe

Denver Gas and Electric Company, Denver, Colo.



THE Denver Gas & Electric Co. offers to its consumers a flat rate for all-night porch light burning, the same being in the form of a yearly contract, in which the consumer agrees to burn his porch light, containing an eight-candle-power lamp, from dusk until dawn, each night in the year. In consideration of this the company agrees to deduct 12 kwh. from the consumption shown and charged for upon each monthly bill, said 12 kwh. to be paid for in a separate charge of fifty cents net per month.

We find that our best argument in soliciting this class of business is that the number of the house may be painted upon the ball, shade, lantern or other translucent covering. This almost invariably greatly increases in the opinion of the prospect the value of his porch light both by day and by night; and adds to the many other advantages of all-night burning, that of illuminating his house number distinctly for the benefit of those seeking his address after nightfall.

We have made arrangements with a local sign painter to do this work for our consumers very cheaply. In many cases the representative takes the porch light globe with him to the shop, returning it next day lettered, and with a charge of only twenty-five cents for plain black lettering, or of fifty to seventy-five cents for fancy gold leaf.

Our Business and Yours

Manufacturers' Articles Postponed

THE series of articles announced in our last issue on "What the Manufacturer is Doing for the Central Stations" is unavoidably postponed a month as some of the material promised did not put in an appearance. All of which shows that other people besides central station men have occasional troubles.



Appreciation

WE feel moved to express our appreciation (though naming no names) of a number of letters which have been received in these last few days, which show that Christmas is not the only season of good-will. We have been fortunate in the support of many good friends for these years, and from time to time word comes to us direct or through devious ways that here or there some central station man has written a letter to an advertiser or to a manufacturer whom we have not yet reached, or to some other central station, and in this letter marked us with his approval.

In the last few weeks, there have been so many of these rays of sunshine, that we have felt it a good

omen for the New Year. When men work for more than mere pay, as most men do, such endorsement from those they serve lightens the task, and we take no small satisfaction in this acknowledging.



A Double-back-action Dollar Idea

A LETTER just came in from a New England central station man marked "A Dollar Idea." Here it is:

"I have had the various Dollar Ideas which have been issued in SELLING ELECTRICITY written on cards, so that I can keep these bright ideas all together where I can consult them from time to time."

It does not qualify exactly as a Dollar Idea, perhaps, for Dollar Ideas must shed a new light and point a new way that can be turned to sales by almost any central station. But as the keynote to the whole scheme of Dollar Ideas, it must be heard.

Dollar Ideas are intended for use. They are born in service and live and grow only in continued application. This card index scheme is a good one, and shows the possibilities in such a collection of other men's thoughts, harnessed for work.

Electrical Progress Department

The Therol System: Heating Water and Cooking with 100% Load Factor

The details of the Therol electric water heater are shown in the accompanying cuts. Although the system is entirely new and untried in this country its success in England has been marked and negotiations are now under way which indicate the formation of an American company for supplying the apparatus at an early date.

The fundamental principle of the system is the storage of energy received continuously in small quantities from the electric

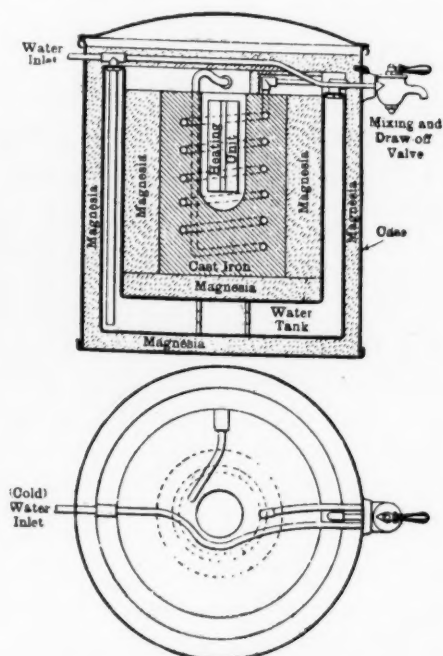
at the other side of the heater; turned a little further cold water mixed with the warm water in the storage tank is obtained, then warm water alone, then warm water mixed with the very hot water from the spiral pipe in the metal block. As the block is normally maintained at a temperature of 600 or 700 degs. F. the last step generally consists in mixing steam with tepid water and thereby obtaining any desired temperature.



"Therol" Electric Water Heater

light mains, the electricity being turned into heat and the heat stored. An ordinary heating unit made of four coils of iron wire insulated with mica is placed in the center of a block of iron, zinc or other suitable metal. Cast into this block is a spiral pipe in which the water is heated. Outside of the pipe is a magnesia casing surrounded by a water tank which is completely inclosed in another layer of magnesia.

The water flows through the apparatus as shown in the diagram, there being three outlets to a special mixing valve. When the valve is turned to the first position cold water is obtained directly from the inlet



Plan and Section of "Therol" Electric Heater

The magnesia lagging in the apparatus prevents the radiation of heat to such a degree that practically every kilowatt hour is used at 100 per cent efficiency. This same principle is used in the Therol cooker, which is made in various forms, all of which use a small amount of current with a large heat storage capacity and operate in a manner similar to a fireless cooker. There is an oven-like compartment of fire brick (to secure proper radiation) around which is placed the iron heat-storage block, insulated with magnesia and surrounded by

a water jacket to absorb any heat which may get through the insulation. The size for ordinary domestic use consumes about 300 watts continuously.

The possibilities of the Therol system do not stop at cooking and water heating, as the large heat storage capacity permits of the "borrowing" of the current for other service. To heat 25 gallons of water per day from 50 deg. to 110 deg. F. requires about 200 watts continuously. An automatic switch has been designed which as other devices are put in circuit diverts the necessary amount of power from the Therol apparatus—always keeping the same load on the central station. Thus flatirons, washing machines, vacuum cleaners and the like may be operated or as many as eight 255-w. tungsten lamps.

The system automatically adjusts itself to the extra service required. If too much current is taken the supply of hot water is diminished—a condition easily remedied by increasing the capacity of the heating element with a corresponding change in the monthly rate. Where additional use of current is to be made some form of excess indicator will prevent the consumer from exceeding the proper load.

The Therol system is, of course, a flat rate proposition, and central stations can profitably make a very low rate on account of the character of the load and the elimination of meters and meter reading. Furthermore, the Therol system being based on a small constant demand instead of a large temporary consumption, as in the case of other heating appliances, there is no need for running special mains, or in increasing the capacity of the station to care for growth in domestic load.

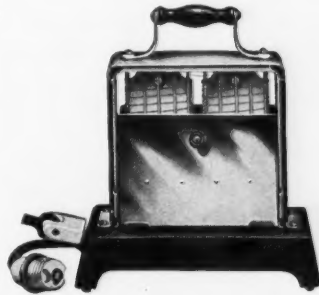
The apparatus can be made to better the 100 per cent load factor through the use of time switches, to cut the heater off during the central station peak, the heat stored in the metal block being more than sufficient to last over the peak period.

Simplex Toaster

An attractive addition to the breakfast room electrical equipment is the new Simplex toaster, illustrated herewith.

The toaster has a polished metal case, in the center of which an upright electric

heater extends from end to end. On each side is a door which confines all the heat within the toaster, making toasting more rapid and preventing drafts from interfering with the operation. Furthermore



the doors prevent crumbs, etc., from falling on the table cloth. The walls of the case are made double with an air space between, and all the interior surfaces are brightly polished heat reflectors. This insures a minimum amount of radiation and loss of heat.

The entire construction is thoroughly substantial and as the doors are readily removable, the device is easily cleaned after a meal. The current capacity of the toaster as shown is 500 watts.

"The Smallest Plug of the Greatest Merit"

With this title Harvey Hubbell, Inc., Bridgeport, Conn., is placing on the market



a new connection plug for use with all small portable electric devices.

The continual improvement in the appearance of electric heating devices and other household appliances has required

some refinement in the various accessories necessary, and the Hubbell Plug should appeal to the central station solicitor as one more talking point. The neat appearance of the plug is shown in the accompanying illustration.

When in use the two corrugated bushings fit snugly together so that the total length is only $1\frac{3}{4}$ inches. It is a straight push plug and held firmly in place by the stiff contact spring shown on the barrel of the plug. Ample room is allowed to carry the cord to the binding screw. The plug is known as "No. 5601."

Wayne Bell Ringing Transformer

The central station solicitor who is looking for more talking points on the advantages of installing electric light will be interested in the little transformer illustrated herewith. While the "watt minutes" used per month will not have a great effect on the revenue of the company, there is a very tangible asset in the relief from all battery troubles on his bell circuits, annun-



ciator systems, etc., given to the customer.

The Fort Wayne Electric Works has taken the same care in designing this device as is used in its larger apparatus. Its attractive appearance permits its installation in locations where ordinary dry cells could not be placed.

The Transformer is made for 110 volt circuits with taps to the secondary winding for 4, 8 and 12 volts.

Delco Heating Apparatus

An extensive line of electric heating devices has recently been placed on the market by the Diamond Electric Co., of Binghamton, N. Y., to which the trade-name of "Delco" has been given.

The Delco Flatirons have a heating element of special non-corrosive metal, so supported that it can freely expand and contract without any internal strain, and having exceptionally large current carrying capacity. This substantial construction is claimed to give a ruggedness and long life to the iron that cannot be obtained by other means. The construction is such that the greater



Delco Portable Oven

part of the iron is used as a heat reservoir, being insulated to radiation and holding sufficient heat to allow the iron to be used for 15 or 20 minutes after the current is turned off. The cover of the iron remains comparatively cool, indicating that the insulation is effective in increasing the efficiency and economy.

The advantages claimed for the Delco Stoves are the few parts used in their construction and the ease with which they are cleaned. Like the flatirons, these stoves are made with a heat storage reservoir which makes a three-heat attachment unnecessary. They are mounted on white porcelain bases which are readily cleaned and make an attractive addition to the other furnishings of the dining-room table.

The Delco Toaster is of the horizontal

type, and like the stove, is simple in construction, readily cleaned and has a dainty white porcelain base. Being of the open grate type it can be used for corn popping and for toasting marshmallows, cheesed crackers, etc., the intense heat giving especially good results.

The Delco Chafing Dish is substantially made and has a removable heater which may be used if desired as an electric stove, adding considerable to the value of the device.

The Delco Percolator consists of the well-known "Universal" coffee machine in which a removable heating unit is inserted. These

heaters will fit any percolator and can be obtained separately. Any one can insert them in place without the use of tools.

The Diamond Electric Co., also makes a compact Air Heater, consisting of a series of long flues, which create a rapid circulation and distribute the warm air throughout the room. The air heaters are made in several attractive finishes.

The Delco Portable Oven, of which an illustration is shown, is well insulated and operates with high economy. The glass doors in the front are a great convenience in ascertaining the condition of the contents while baking.

News and Reviews

Christmas Wreaths on Street Lamps

The Denver Gas & Electric Company, Denver, Col., created considerable popular enthusiasm by decorating the ornamental street arcs with wreaths of Christmas greens. For exterior decoration of this character, the idea is entirely new and it attracted a great deal of favorable comment from both press and public. This is another evidence of the enterprising commercial methods of the Denver company.

Eliminating the Month-End Rush in Fort Wayne

The Wabash Valley Traction Co., Fort Wayne, Ind., recently adopted a new scheme which is expected to eliminate the avalanche of work common at the end of the month when the meter reading and billing takes place. The territory has been divided into twenty districts, each one having approximately the same number of customers. The meters in these districts will be read at different periods during the month and the bills sent out immediately. The clerical work will, therefore, be evenly distributed and the auditor's load curve straightened out.

F. H. Gale Lectures

Mr. Frank H. Gale, head of the Electric Heating Department of the General Electric Company, lectured before the New York Electrical Society at its 290th meeting, held

on December 29th. The subject of the lecture was "Electricity for Every Social Service," and a large number of lantern slides were shown showing the endless variety of the applications of electricity, as it features in our daily lives.

There was a very animated discussion of the paper participated in by a large number of the members, embracing central stations, men, contractors and manufacturers. Mr. Gale stated in the discussion:

"The sales of electric heating appliances for the past year were double that of any previous year and of electric flatirons equal to the sales of the preceding eighteen months."

Toronto Company Affairs

A complete reorganization of the Sales Department of the Toronto Electric Light Co., Limited, has been effected, with Mr. W. A. Martin, the secretary of the company, retaining the active management, and Eugene Creed, late chief power agent, assistant sales and advertising manager. Mr. H. I. Millard joins the sales department as lighting agent. The company will continue its policy of energetically canvassing the city for new business, and fostering pleasant relations with present consumers.

The Company's Sales Department em-

ploys fifteen men, who work on light and power prospects. An energetic sign and outline campaign is now on, and many beautiful signs are in course of erection on Yonge, King and Queen Streets.

Irons are sent out on trial to all consumers, and though the Canadian winters are long and not over mild, yet the sale of heating appliances is perhaps greater than in many cities of equal size (350,000 population) in the United States.

The Christmas business was phenomenal, and far beyond the company's expectations.

The company expects to have the banner year of its history in 1910.

Activity at Oak Bluffs, Mass.

Mr. John A. Rockwell, manager, Vineyard Lighting Company, Oak Bluffs, Mass., has begun an active campaign for new business.

Mr. Rockwell has just assumed charge of commercial development and is planning to make a large increase in the company's business.

A Ten-Year Calendar

H. G. McFaddin & Co., 40 Warren Street, New York, are distributing an ingenious and useful desk blotter and ten-year calendar to advertise their "Emerlite" desk fixtures. The calendar not only shows the current month but may be used to determine the day of the week for any date within the ten years covered.

Saved by Low Voltage Tungstens

The Grand Opera House at Holyoke, Mass., has for some time past purchased its current from an isolated plant at four cents per kwh., making the cost of current in this particular case six cents per kwh. Recently the isolated plant raised the rate to the same figure charged by the central station. The lighting company made a proposition to the Opera House at once and low voltage tungsten lamps with Hallberg transformers and economizers for the moving pictures machines were installed. The present cost of the current is no more under the higher rate than when formerly operating at the low rate of the isolated plant. The light is much superior.

H. H. Seaman Joins Johns - Manville

The H. W. Johns-Manville Co. has recently appointed Mr. H. H. Seaman assistant manager of its New York Electrical Department. For seven years Mr. Seaman was associated with the Electric Storage Battery Co. at Philadelphia, Detroit and Cleveland, and for the past two years has been manager of their Atlanta office.

Baker Will Build \$100,000 Garage and Salesroom in Cleveland

The Baker Motor Vehicle Co. will operate its own retail sales agency in Cleveland after Jan. 1st., and is erecting a handsome garage and salesroom at Euclid Ave. and E. 71st St.

The new Baker garage will be fire-proof, of brick and stone construction, 160x200 feet, and will be one of the largest and best equipped garages in the country devoted to the care of electric motor cars.

Cleveland being the home of the electric motor car, it naturally has more electrics than any other city of its size in the United States, and this commodious new garage will enable the Baker Company to offer its patrons unequalled garaging facilities and the services of expert attendants.

More Power Engineers in Providence

Mr. E. R. Davenport, Sales Agent, Narragansett Electric Lighting Co., Providence, R. I., announces that Mr. L. P. Perry, formerly with the Connecticut Company of Waterbury, is now associated with his organization, as power engineer. Mr. F. M. Fernald, late of the Collyer Insulated Wire Co., and Mr. C. G. Devlin, who has been with the Niagara Falls Power Co., have also joined the Narragansett staff in a similar capacity.

This will make a total of seven men working exclusively on power business, which, Mr. Davenport says, is probably the largest force of solicitors on power in any city in New England.

United States Company Formed

The United Service Company has been organized to do the purchasing for the subsidiary companies of the Susquehanna Railway, Light & Power Co., of 40 Wall

Street, New York City. The company has also taken over the entire business of the Railways Equipment Company, and will deal in supplies of all kinds, especially equipment and supplies necessary for the operation of railways, both steam and electric; electric light companies, gas companies and water companies.

The office of the United Service Company is at No. 40 Wall Street, and the officers are: S. J. Dill, president; Henry Morgan, vice president; A. V. Wainwright, secretary; W. D. Martin, treasurer; F. G. Robinson, purchasing agent.

All the stock of the United Service Company is owned by the Susquehanna Ry., Lt. & Pr. Co.

The Toledo Electrical Show

Further announcements of the plans for the coming electrical show, which will be held in Toledo, Ohio, from Jan. 31st to Feb. 5th, embrace in addition to the regular exhibition features, a course of lectures by

noted men in the electrical industry, special demonstrations of appliances in the lecture room, a bread baking by electricity contest and numerous drills, exercises and contests between local organizations of various kinds.

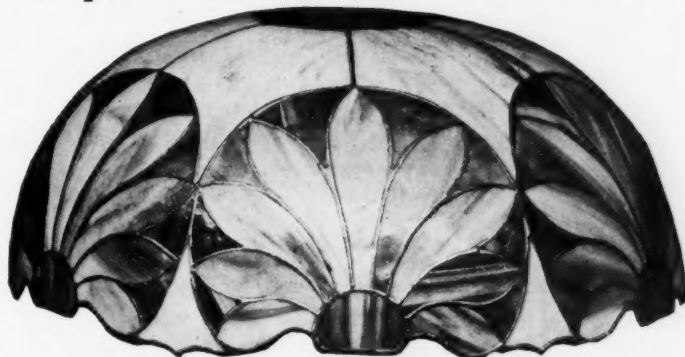
Invitations have been sent to all the salesmen and representatives of central stations and electrical dealers in Ohio, Indiana, Michigan and Kentucky, and separate days will be set apart for the Electric Light Associations of Ohio, Michigan and Indiana, and the American Institute of Electrical Engineers.

Mr. H. A. Waite Moves Up

Mr. H. A. Waite, who has been assistant power engineer for the Easton Gas & Electric Co., has been promoted to succeed Mr. R. A. MacGregor, resigned. Mr. MacGregor, as has been announced, is now general manager of the Light, Heat & Power Co., Connorsville, Ind.

THE PRESTIGE OF YOUR SALESROOM

Depends on the Goods You Show



The most conspicuous articles are your Shades and Fixtures.

ARE THEY THE BEST?

No branch of the art of Electric Lighting depends so much on EXPERIENCE as the manufacture of Art Glass Shades. Every piece of UNIQUE is backed by the Reputation of the Pioneers in this LINE.

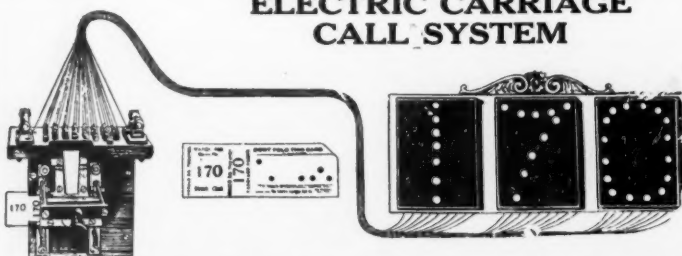
UNIQUE ART GLASS AND METAL CO.

46 Park Place, New York

In writing to advertisers, mention "Selling Electricity."

ELECTRIC CARRIAGE CALL SYSTEM

USED BY ALL
THE LEADING

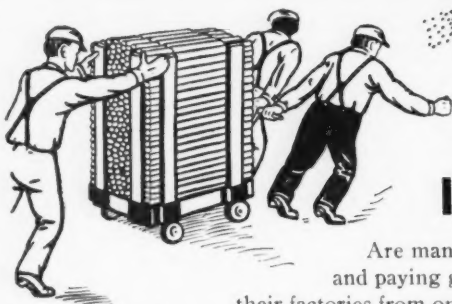


**Hotels and
Theaters**

SEND FOR
CATALOGUE

THE ELECTRIC CARRIAGE CALL AND SPECIALTY CO.

173 Christopher Street, NEW YORK



STOP THIS
It Will Pay You To Do It.

Are manufacturers in your locality wasting valuable time and paying good money to have unfinished work hauled around their factories from one machine to another? Why don't they locate their machines where the work is? "Impossible," they say, "can't run line shafts and belts there." That's the point exactly—and your opportunity.

EQUIP THEIR MACHINES WITH FORT WAYNE MOTORS

and they can locate them anywhere. The chances are they will save from 35% to 50% of the power they are now wasting in transmission, and even more when only a part of their machines are running. They can dispense with an engineer, save floor space, get rid of the cumbersome shafting and belting, and pay for just the power they use. You can easily convince them that they will save the price of the motors in a short time and greatly increase the quantity and quality of their work. BUT—there's a big difference in motors and it won't pay you to sell them any but the **best**. Our FREE bulletin, "Motor Drives," gives the whys and wherefores.

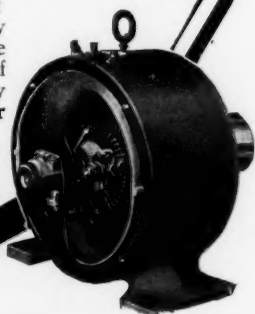
FORT WAYNE ELECTRIC WORKS

1604 BROADWAY, FORT WAYNE, INDIANA

Factories: Fort Wayne, Indiana, and Madison, Wisconsin

Branches: All Large Cities

Send
Today
for 24 page
Bulletin "Motor Drives"



High Grade
Steadily Burning
or Flashing

**ELECTRIC
DISPLAY
SIGNS**
and
ACCESSORIES

HALLER SIGN WORKS (Inc.)

704 S. Clinton Street, CHICAGO

In writing to advertisers, mention "Selling Electricity."

We Are Bringing In New Customers for Central Stations

How do we know?

Because we have sold 25% of our

Thor Home Laundry Machines

to people who have never had electricity in their homes before.

They were satisfied with gas for light, but wanted an electric home laundry machine to save work, expense and servant complications. They bought one and then asked for current.

If we can sell them so can you, both to customers and prospects.

Think it over.

Hurley Machine Company

CHICAGO

Monroe & Clinton Sts.

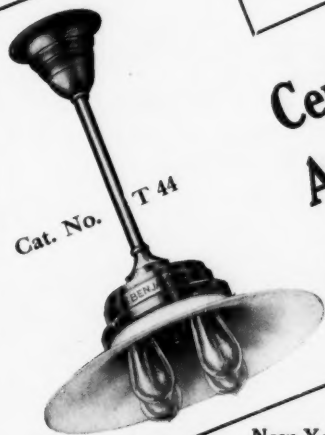
NEW YORK

Flatiron Building



Where Central Stations

are installing Tungsten fixtures subject to sudden jars, we are prepared to furnish a means for protecting the life of the lamps in an **effective Canopy Shock Absorber**. Any vibration is thus checked at the point of the fixture support and rendered harmless before it reaches the lamps themselves.



**Central Station
Announcement No. 14**

**Benjamin
Tungsten Shock Absorbers**

furnished if specified **FREE OF CHARGE** with accompanying 3-6 Light Standard Tungsten Arcs.

*Write for our descriptive circulars on
Tungsten Fixtures and Accessories.*

Benjamin Electric Mfg. Co.

New York 507 West Jackson Boulevard, Chicago San Francisco



In writing to advertisers, mention "Selling Electricity."

The Member Companies of the

National Electric Lamp Association

have an annual capacity of 50,000,000 incandescent lamps.

Their aggregate manufacturing floor space exceeds 35 acres.

They employ 6,000 people.

They expend \$400,000 annually in Research, Development and Engineering.

They maintain the most extensive lamp testing facilities in the world by which their acknowledged supremacy in Lamp Quality is maintained.

They manufacture a more varied line of Incandescent Lamps than any other interest in the world



CO-OPERATION, PROGRESS, QUALITY

In writing to advertisers, mention "Selling Electricity."

The Member Companies of the
National Electric Lamp Association
were the

First to develop and place on the market a 40-watt Tungsten Lamp.

First to develop, demonstrate and put on the market the Tantalum Lamp for Street Railway Service.

First to develop and place on the market the 5-watt Tungsten Sign Lamp.

First to develop and place on the market Tungsten and Tantalum Lamps for Train Lighting Service.

First to develop and place on the market Tungsten Lamps for Automobile Service.

They now announce
THE MAZDA LAMP

These are a few of the latest achievements of the Member Companies; some of whose individual records date from the first commercial appearance of the incandescent lamp.



CO-OPERATION, PROGRESS, QUALITY

In writing to advertisers, mention "Selling Electricity."

MAZDA LAMPS

FOR the purpose of ensuring that the incandescent lamps manufactured by them, respectively, shall have the advantage of the latest discoveries and inventions in the art, wherever made, the foremost lamp companies of America have made arrangements whereby the technical staff of the Research Laboratory of the General Electric Company, in collaboration with the technical staff of the National Electric Lamp Association and others, shall regularly follow the work which is being done in the factories and laboratories of the leading foreign and American lamp companies and shall keep constantly informed as to the progress and development in methods and processes in each, distributing the information thereby secured to the lamp manufacturing companies enjoying the benefits of this arrangement, and selecting from all known materials and processes those best fitted for each different style and type of metal filament incandescent lamp made for or by the respective American companies.

For the purpose of identifying the lamps made in accordance with the information thus obtained, the Research Laboratory has adopted as a trade-mark the word **MAZDA**, and its presence on any metal filament lamp evidences that the expert knowledge and selective skill of its technical staff entered into the production of that lamp and that the best materials and processes known to it as fitted for that type of lamp have been employed in its manufacture.

National Electric Lamp Association
CLEVELAND

CO-OPERATION, PROGRESS, QUALITY



MAZDA LAMPS

The MAZDA lamps will be furnished by the following member companies of the

National Electric Lamp Association

The Banner Electric Co.
Youngstown, Ohio

The Brilliant Electric Co.
Cleveland, Ohio

The Bryan-Marsh Co.
Chicago, Ill.
New York City
Oakland, Cal.

The Buckeye Electric Co.
Cleveland, Ohio

The Buckeye Electric Lamp Co.
City of Mexico

The Cleveland Minia. Lamp Co.
Cleveland, Ohio

The Colonial Electric Co.
Warren, Ohio

The Columbia Inc. Lamp Co.
St. Louis, Mo.

Economical Electric Lamp Co.
New York City

The Fostoria Inc. Lamp Co.
Fostoria, Ohio

The General Inc. Lamp Co.
Cleveland, Ohio

Monarch Inc. Lamp Co.
Chicago, Ill.

The Munder Electric Co.
Springfield, Mass.

New York & Ohio Co.
Warren, Ohio

The Shelby Electric Co.
Shelby, Ohio

The Standard Electrical Mfg. Co.
Warren, Ohio

The Sterling Electrical Mfg. Co.
Warren, Ohio

The Sunbeam Inc. Lamp Co.
Chicago, Ill.
New York City

The Sunbeam Inc. Lamp Co.
of Canada, Ltd.
Toronto, Ont., Can.

The Warren Elec. & Spec. Co.
Warren, Ohio

In writing to advertisers, mention "Selling Electricity."

SUNBEAM

HIGH EFFICIENCY LAMPS

ALL REGULAR TYPES, WATTAGES AND VOLTAGES

**Sunbeam
Mazda**

**Sunbeam
Tantalum**

**Sunbeam
Gem**

Our lamps are manufactured under the supervision of the ENGINEERING
DEPARTMENT OF THE NATIONAL ELECTRIC LAMP ASSOCIATION

Sunbeam Incandescent Lamp Company

Established 1889

MANUFACTURERS

Members of the National Electric Lamp Association

CHICAGO

TORONTO

NEW YORK

Western Electric Company

GENERAL DISTRIBUTORS

New York
Chicago
San Francisco

Philadelphia
St. Louis
Seattle
Los Angeles

Boston
Cincinnati
Kansas City

Pittsburg
Minneapolis
Denver
Salt Lake City

Atlanta
Omaha
Dallas

In writing to advertisers, mention "Selling Electricity."

"G.I." MAZDA "G.I."

The Lamp of Quality

If you wish your orders executed
with a service in a class by itself - - -

If you would use a lamp having a
quality distinctly its own, you should
specify - - -

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the top notch in the development
of lamps of the Tungsten filament
type. They give the highest known
electrical efficiency of any incandes-
cent lamp and their announcement
at this time is in keeping with the
up-to-date progressiveness that has
always characterized G. I. Lamps.

The General Incandescent Lamp Co.

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BRYAN-MARSH MAZDA LAMPS

**There is something about
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You are losing real money.

Ask us.

BRYAN-MARSH COMPANY

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In writing to advertisers, mention "Selling Electricity."

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ASK US

ABOUT
THE LATEST LAMP

The Banner Electric Co.
Youngstown, Ohio



THE BUCKEYE ELECTRIC COMPANY,
in line with its progressive organization,
announce at this time the placing on the
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Buckeye Mazda Lamps

We introduce these lamps to
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The Buckeye Mazda

is the *improved* tungsten filament lamp we are placing on the market today.

The Buckeye Mazda

is the lamp you should specify on your orders when you want the most efficient and highest type of metal filament lamps.

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Extend Your Store Lighting Business



You can give a strong impetus to your store lighting business by showing merchants where improvements can be made in their stores, and helping them to get better results from the current they are using.

An excellent opportunity to interest merchants in better store lighting is offered by the Intensified Arc Lamp, a new lighting unit that is in every particular eminently satisfactory for this purpose. It is one of the latest products of our illuminating engineers—the result of years of study and exhaustive experiment.

The "Intensified" Arc Lamp is so named because of the high current intensity resulting from using small diameter carbons. When an arc is formed, the whole of the carbon tips as well as the arc crater becomes a source of

light. The efficiency is thereby increased, and the light given off more closely approaches daylight in color than that of any other artificial illuminant. The reflectors and globes used are designed to distribute the light in suitable proportions in all parts of the working angle.

The Intensified Arc Lamp

The Profit to Central Stations

Every merchant knows that a well-lighted store is an important selling aid. With the improved illumination afforded by the Intensified Arc Lamp, you can make a most effective campaign for store lighting business. You can provide this illumination at a greater profit, too; for at the same cost of energy the maintenance cost of this lamp will be very much less than with any other system.

Our illuminating engineers will be glad to tell you more about Intensified Arc Lamps. Write to-day for valuable information.

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MAZDA LAMPS

FOR the purpose of insuring that the incandescent lamps manufactured by them, respectively, shall have the advantage of the latest discoveries and inventions in the art, wherever made, the foremost lamp companies of America have made arrangements whereby the technical staff of the Research Laboratory of the General Electric Company in collaboration with the technical staff of the National Electric Lamp Association and others, shall regularly follow the work which is being done in the factories and laboratories of the leading foreign and American Lamp companies and shall keep constantly informed as to the progress and development in methods and processes in each, distributing the information thereby secured, to the lamp manufacturing companies enjoying the benefits of this arrangement, and selecting from all known materials and processes those best fitted for each different style and type of metal filament incandescent lamp made for or by the respective American companies.

For the purpose of identifying the lamps made in accordance with the information thus obtained, the Research Laboratory has adopted as a trade-mark the word

MAZDA

and its presence on any metal filament lamp evidences that the expert knowledge and selective skill of its technical staff entered into the production of that lamp and that the best materials and processes known to it as fitted for that type of lamp have been employed in its manufacture.

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The Largest Manufacturer of Electrical Apparatus in the World.

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WHEN was it installed—where? Do you know there are only three lamps in existence of the type then used? Know, for the first time, the accurate details of this crude plant, the curious rheostat, the lighting fixtures, etc.

In **POPULAR ELECTRICITY** for January, 1910, appears the only authoritative account of the first commercial electric lighting plant in the world. Joseph E. Hinds, ex-member of Hinds, Ketchum & Co., for whom the plant was installed in 1880, writes the account and

Thomas A. Edison Vouches For This Intensely Interesting Narrative

which records, for all time, the events connected with the installation and early operation of a plant which marked an epoch in the world's history. Illustrations from original photographs show the plant, type of lamp used (of which only three are in existence), the curious rheostat, lighting fixtures, etc.

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Are you interested in *electrical development*? Then read and preserve this article. Are you interested in *any* phase of electricity? Then you will find **POPULAR ELECTRICITY** brim full of the latest features of electricity in their application to science, commerce and every day life.

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point the way to increased income and success to both merchants and central stations.

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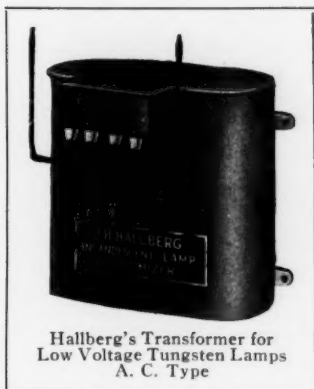
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Specialties for Getting Good Business out of Bad Prospects



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(alternating or direct current)

FOR TUNGSTEN LAMPS

Tungsten Sign Lamps operated in parallel at high efficiency avoiding the troubles of series or series parallel system.

10 to 12-volt Tungstens may be substituted for carbon lamps without rewiring sign.

Mills, factories or machine shops using low-voltage Tungstens pay the same revenue per candle-power to the Central Station as those using the 110-volt types, but **SAVE MORE THAN HALF** their lamp-renewal bills. *STOPPING THIS WASTE FOR YOUR OLD CUSTOMERS WILL BRING YOU NEW ONES.*

HALLBERG'S AUTOMATIC ECONOMIZERS

For Moving Picture Machines

SAFE, COOL, RELIABLE, ECONOMICAL

Saving over Rheostatic Control:

DIRECT CURRENT		ALTERNATING CURRENT	
110 volts,	50 per cent.	110 volts,	66 per cent.
220 volts,	70 per cent.	220 volts,	82 per cent.
550 volts,	90 per cent.	Greatly improves light on A. C.	



Hallberg Automatic
A. C. Economizer

Write me about these and others—Automatic Cut-out for Series Tungsten Lamps, High Efficiency, Reliable Flaming Arc Lamps, Moving Picture Machines, etc., etc. *I AM PREPARED FOR YOUR HARD CASES.*

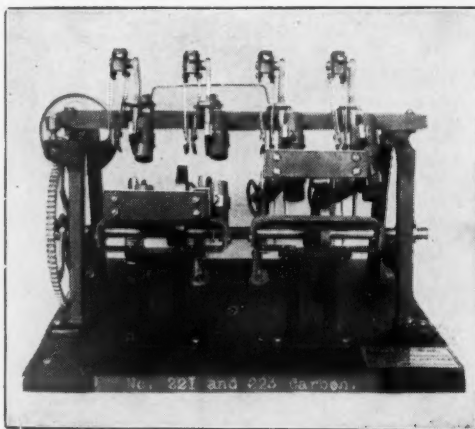
J. H. HALLBERG
32 Greenwich Ave. NEW YORK CITY

A Hundred Years Ago

Street lighting was protested in New York on the grounds that light streets would have a tendency to keep a man down town nights instead of at his home and by so doing would lead him into evil ways. **To-day** the streets of any city are lighted to **prevent crime**, not to encourage it.

EIGHT YEARS AGO

Flashers were frowned upon by the central station owners, because their use meant smaller bills for operating an electric sign. **To-day**, they are being used universally by central stations to **increase** the sale of current.



Dull's Flashers

Are the standard of the world. They will outwear any sign built. They will cut the cost of burning the sign in half and make ten times as many people see it. We make them for every purpose under the sun.

***More in Use Than All
Others Combined.***

SEND FOR CIRCULARS

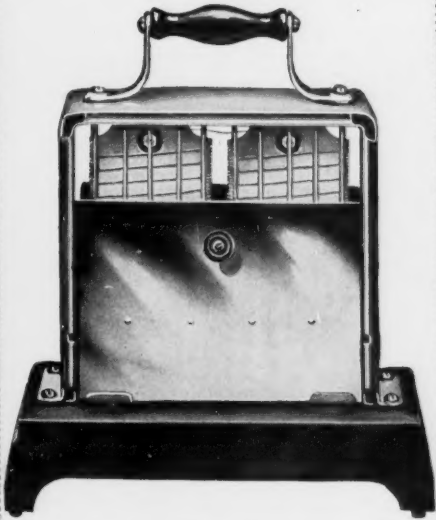
Reynolds Dull Flasher Company

152 5th Avenue, CHICAGO

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NOW IS THE TIME



to sell the Simplex Toaster, new in design and highest in finish. This Toaster will not only help you sell more current but will lead to complete cooking outfits.

Built for daily use it is a most attractive addition to the table or sideboard. This Toaster is not only clean, convenient, simple and durable, but it never fails to produce crisp golden bread toasted right.

This Toaster carries with it the Simplex guarantee which has behind it over fourteen years' experience in electric heating. By installing Simplex Devices you will be sure of giving your customers satisfaction from the start.

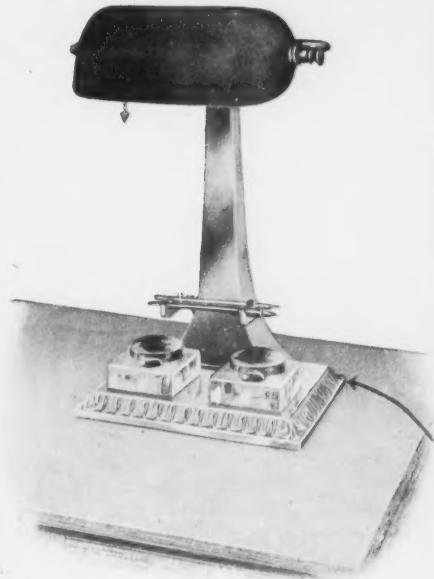
Write for booklet "K."

SIMPLEX ELECTRIC HEATING CO.

Cambridge, Mass.

Monadnock Block, Chicago
612 Howard St., San Francisco

"Emeralite" Illumination



THE "EMERALITE" DESK FIXTURE
(Patented)

Made in 6 different patterns, with or without the Space-saving Inkstand Base shown by arrow.

Intense general illumination of large rooms is uneconomical and gives an objectionable glare from which there is no rest when the eyes are lifted from the work. The best system has a moderately intense general illumination and a far more intense local illumination, as over the desks in an office, or the reading table in a library.

You can install "Emeralite" Fixtures because they are Scientific, Artistic and Economical.

Send for Illustrated Booklet and 10-year Calendar Desk Blotter.

H. G. McFaddin & Co.

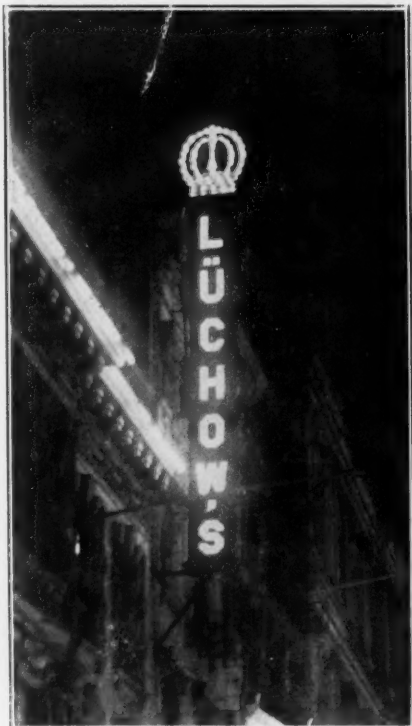
40 Warren St., New York

Where Shall We Eat?

How many times have you asked that question? And your friend usually replies, "Oh! any old place that's handy."

And if you see this sign shining up ahead, you say — "Well, let's drop in Lüchow's" — and that settles it.

That's why electric advertising pays this restaurant, for the strong, forceful sign surmounted by the Bavarian crown of gold and blue velvet sets a high standard and invites the hungry.



Have you laid this argument before the hotels and restaurants in your city? Have you told them where to buy this kind of a sign? Do they know that Betts & Betts are electric advertising experts?

We build our signs to satisfy the Purchaser **in service** — that means **to advertise his particular business.**

All flashers, receptacles, color caps, etc., are our own make. We know they are right. That protects you and your customer.

Send us the names of your Hotel and Restaurant Prospects and we will work with you.

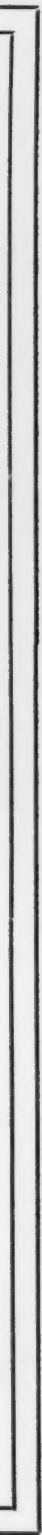
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